MODERN PRACTICAL DESIGN

J. Cooper

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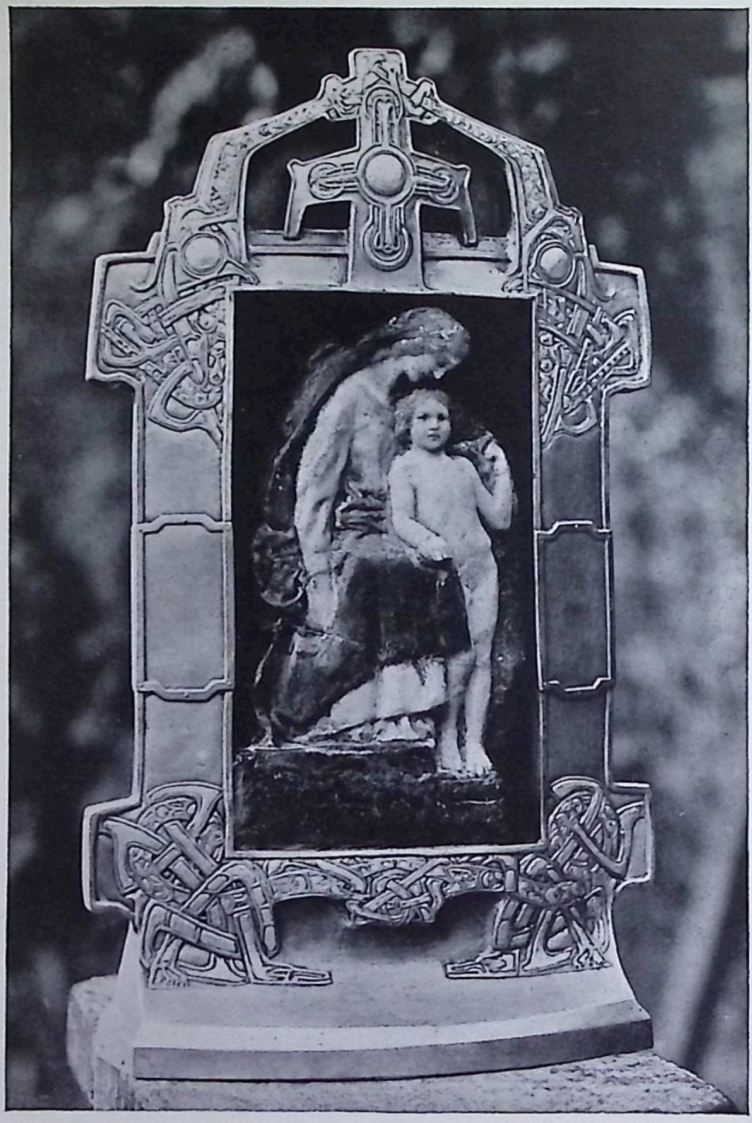

CROSS IN SOLID ENAMELS. (By Alexander Fisher.)

MODERN PRACTICAL DESIGN

BY

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PREFACE.

A PREFACE affords an author an opportunity of explaining his position; of putting himself right, so to speak, with his readers; of defining the scope and limits of his work.

Design, in its most comprehensive sense, may be said to enter into every department of art, since the decorative principle governed the art of all ages down to the period of the invention of oil painting in the early part of the fifteenth century, which event ultimately resulted in the divorce of painting from architecture and relegated the painted picture to the position of a moveable article of furniture. It will be convenient, therefore, for present purposes to draw a sharp line of distinction between the purely pictorial or so-called "fine" arts, and those which have come to be regarded as "lesser" or "applied" that form the subject of the present work.

Properly speaking, *all* art should be "applied," was indeed "applied," until within a comparatively recent period. That fine saying of Alfred Stevens, "I know of but one art," expresses a truth which cannot be gainsaid, and although mural and sculptured decoration must be placed in the front rank of the applied arts, second only to the architecture which it adorns, there can be little doubt that during recent periods pictorial art has arrogated to itself an importance out of all proportion to its real value.

The various causes, social and economic, which have

led to this state of things, need not, however, concern us here. Chapters are given on the more important crafts, as Textiles, Book Decoration, Pottery, Stained Glass, Embroidery, Woodwork, &c., together with a short chapter on simple space filling, thus covering the syllabuses of the examinations in elementary, advanced, and "honours" design instituted by the Board of Education. There is also included an important introductory chapter demonstrating the principle of ornament in plant form, the substance of a more extended work on the subject written and illustrated some ten years ago, but never issued.

It will be obvious that in a work aiming at covering such a wide area, little more than the mere fringe of the different subjects can be touched; it will be necessary for students to supplement their reading by reference to the monographs published on the different crafts, which are well known, and many of which are referred to in the following pages.

The present work differs from "Principles of Design" in two particulars: (1) The last-named is confined to the elucidation of principles, while "Modern Practical Design" deals with technique, tools and practical methods relating both to design and craftsmanship; (2) the illustrations of the latter are, with one or two exceptions, representative examples of the work of the modern craftsman, instead of, as in "Principles," drawn chiefly from past art.

No comparison is, however, instituted between old and modern art to the disadvantage of either, nor is it suggested that modern examples are better for purposes of study than old. The latter must always demand the close attention of students, since it is mainly by the light of past experience

that we are able to advance; but, although the most convinced modernist would hesitate to affirm that the value of present-day art production outbalanced the accumulated effort of past periods, it must be conceded that within the last few decades a new note has been struck both in decorative and pictorial art, the best examples comparing favourably with any but the finest old work. It is equally certain that modern craftsmanship has hitherto received but scant recognition at the hands of recent writers on art, still less at the hands of the public. The fabulous prices at present paid for old work both in the fine and applied arts, to the neglect of the modern craftsman, has become little short of a scandal. The late F. W. Moody declared that in his opinion no work of art ought to last more than fifty years! And if we accept his proviso of a continuous supply of Michel Angelos and Raphaels, quite a reasonable expectation with certain reservations if art were taught on scientific principles, there is something to be said in favour of this contention.* We owe a duty to ourselves, from the fact that living craftsmen are one with us in thought and feeling; we owe something also to posterity, from the circumstance that contemporary craftsmen will, in their turn, become old masters.

* This requires some little explanation. Moreover, a distinction must be drawn between these two artists. Raphael's actual knowledge of the human figure was distinctly limited, although his genius was almost unbounded. There can be no doubt that, given a sufficiently able instructor, all the facts of the human figure that Raphael knew, together with the main principles of his art, may be imparted to students. On the other hand, Moody, who was no boaster, used to declare that whenever he imagined he had discovered a new principle or method of treatment of any portion of the human figure, he always found that Michel Angelo had forestalled him, and this, he declared, he could say of no other artist,

My best thanks are due to the various craft workers who have so willingly responded to my invitation to allow illustrations of their work to be given, the selection of which, though made with considerable care, has necessarily been to some extent a matter of convenience, and claims no sort of completeness. I have especially to thank Miss Annie French for the charming pen drawing executed specially for this work. I have pleasure in expressing my obligation to the various publishers and owners, which would form a somewhat lengthy list, and are acknowledged individually on the different illustrations.

G. WOOLLISCROFT RHEAD.

DOUNE LODGE,

Putney, S.W., 1912.

CONTENTS.

CHAPTER		PAGE
I.	PLANT FORM AS THE BASIS OF ORNAMENT —THE ROOT, THE STEM, THE BUD, THE LEAF, THE FLOWER, THE FRUIT, THE SEED	1
II.	THE ORNAMENTAL FILLING OF GIVEN SPACES	55
III.	"ALL-OVER" PATTERNS — WALL-PAPERS, PRINTED FABRICS, TEXTILES . . .	71
IV.	BOOK DECORATION — PAGE ORNAMENTATION, ILLUSTRATIONS AND BORDERS, INITIAL LETTERS AND LETTERING, HEAD AND TAIL PIECES, TITLE-PAGES, END PAPERS, EX-LIBRIS, COVERS AND BOOK-BINDING	91
V.	POTTERY	119
VI.	STAINED GLASS	143
VII.	METAL WORK AND JEWELLERY . . .	158
VIII.	WOOD WORKING AND CARVING	173
IX.	DRESS EMBROIDERY, FANCY COSTUME, AND THE FASHION PLATE	187
X.	FANS AND LACE	215
XI.	POSTERS	232

LIST OF ILLUSTRATIONS.

Cross in Solid Enamels, by Alexander Fisher . . *Frontispiece*

FIG. PAGE

1. Lombardic Initial Letter, by the Author 1
2. Wild Strawberry, White Dead Nettle and Campion . . 4
3. Germination of Sycamore, Pea, Nut, Kidney Bean . . 6
4. Turnip and Carrot, Artichoke 7
5. Potato 8
6. Diagram of Root Systems 10
7. Lesser Celandine 11
8. Stems and Stalks: Blackthorn, Groundsel, Dandelion, Wild Barley, Bindweed, Virginia Creeper 12
9. Vine Tendrils 15
10. Ivy 17
11. Rhizomes 19
12. Tail-Piece, Trifoliated Plant 21
13. Buds: Virginia Creeper, Horse Chestnut, Ivy, White Bryony, Lily of the Valley 22
14. Buds: Horse Chestnut, Privet, Corm of Crocus . . . 24
15. Spring Buds 25
16. The Budding of Black Bryony 26
17. Various Types of Leaves 28
18. Linaria 29
19. Leaves: Development of Contour 31
20. Cinquefoils: Development of Contour and Veining . . 32
21. Tail-Piece 35
22. Diagrams of the Flower: Wild Rose, Canterbury Bell . . 36
23. The Calyx (different types) 37
24. Cobœa Scandens 37
25. Poppy, Field Daisy, Lily of the Andes 39
26. Various Flower Forms 41
27. Sweet Pea 42
28. Anemone, Pansy 42
29. Catkin of Birch 44
30. Spanish Iris 45
31. Love in a Mist 46

FIG.		PAGE
32.	Welsh Onion, White Bryony	47
33.	Fruits and Seeds	50
34.	Section of Apple	51
35.	Holly and Mistletoe	52
36.	Bay	54
37.	The Ornamental Value of Doubling	56
38.	Linear Plannings	57
39.	Colour Spacing and Space Filling	59
40.	Setting out of Spandrils	61
41.	Powdering, Spotting, and Sprigs	62
42.	Field Daisy: Diapers	63
43.	Various Methods of Setting Out	64
44.	Boundary Lines Forming Feature of Design	64
45.	Simple Diaper: Hazel Nut, with Planning	65
46.	Linear Plannings of Borders	66
47.	Convolvulus: Study from Nature and Application	68
48.	Borders and Treatment of Angle	69
49.	Interlacing Border of Vine Tendrils	70
50.	Methods of Shading	72
51.	Wall-Paper and Damask Hanging, by J. H. Dearle	74
52.	Planning of Simple Repeats: "Drop" Repeat	76
53.	Variations of the "Drop" Repeat	78
54.	"Drop" Repeat and Method of "Proving" a Pattern	79
55.	White Lining	80
56.	Designs for Cretonnes, by C. F. A. Voysey	84
57.	Planting	88
58.	Design for a Carpet, by William Morris	89
59.	Lombardic Initial, by the Author	91
60.	Page Proportioning	92
61.	Two Pages from Blake's "Jerusalem"	93
62.	Bower Maidens, by Annie French	95
63.	The Dream, by Jessie King	97
64.	Title-Page: "Songs of Innocence," by William Blake	99
65.	Title-Page, by Garth Jones	99
66.	Frontispiece and Title-Page, by Laurence Housman	101
67.	End Papers	103
68.	Etched Book-Plate, by G. W. Eve, R.E.	106
69.	Etched Book-Plate, by J. F. Badeley, A.R.E.	107
70.	Book-Plate, by E. G. Reuter	109
71.	Etched Book-Plate, by Ethel King Martyn, R.E.	110
72.	Tooling, with Unit	111
73.	Tooled Border	111

FIG.		PAGE
74.	Leather Cover, by Louis Rhead	114
75.	Cloth Cover, by A. A. Turbayne	114
76.	Cover, by William Nicholson	116
77.	Paper Cover, by Elihu Vedder	116
78.	"Ruskin" Ware, by W. Howson Taylor	118
79.	The Early British Potter, by G. W. & F. A. Rhead	120
80.	Pottery Materials and Tools	122
81.	Embossed Tiles, by T. R. Spence	124
82.	Pottery Materials and Tools	126
83.	Martin Ware	128
84.	Glazed Earthenware Figures, by Mrs. Harold Stabler	132
85.	Lustre Vases: The Pilkington Tile and Pottery Co.	134
86.	Lustre Bottle, by William De Morgan	138
87.	Majolica Dish, by the Author	140
88.	Cartoons for Stained Glass, by Ford Madox Brown	142
89.	Stained Glass Materials and Tools	145
90.	"Jesse" Window, Burford Church, Tenbury, by the Author, from Sketch of J. C. Powell	148
91.	Window at St. Michael's Church, Bedford Park, by J. H. M. Bonnor	149
92.	Design for Plain Glazing, by Guy Miller	152
93.	Leaded Light, by J. F. Hogan	152
94.	Leaded Light, by Sir Edward Burne-Jones	154
95.	"The Song of Songs": Cartoon, by Sir Edward Burne-Jones	155
96.	Materials and Tools for Metal Work	160
97.	Cross and Candlesticks in Steel, by Ernest W. Gimson	162
98.	Fire-Irons in Wrought Iron, by Ernest W. Gimson	162
99.	Ciborium, by J. H. M. Bonnor	164
100.	Copper Repoussé Panels, by Harold Stabler	166
101.	Bracelet Earrings and Pendant, by Alice M. Camwell	170
102.	Oak Mantel-Piece, by John F. Bentley and J. Erskine Knox	172
103.	Incised Work: Chip Carving, and Tools	174
104.	Various Marquetry Patterns	178
105.	Inlaid Lectern, by Ernest W. Gimson	180
106.	Oak Chest, designed by Fred Roe, R.B.A., carved by W. Aumonier	184
107.	Frames and Tools for Embroidery	188
108.	Stitches	190
109.	Embroidery on Greek Sculpture, Athens Museum	192
110.	Designs for Children's Dresses, by Mrs. F. H. Newbery	192
111.	Embroidered Bodices, by Anne Macbeth	194

FIG. PAGE
112. Queen Alexandra's Coronation Robe, designed by Frederick Vigers 195
113. Designs for Embroidered Panels, by Jessie M. King . . 196
114. Designs for Fancy Dresses, by Frederick A. Rhead . . 198
115. Canary Creeper and Nasturtium, by the Author . . . 202
116. Design for Fancy Dress (Canariensis), by the Author . 203
117. *Gloriosa Superba:* Study from Nature and Application to Fancy Dress, by the Author 205
118. Etching by Hollar 207
119. "Two Ladies in the Newest Dress," 1775 207
120. Costumes of Berlin Ladies, by Daniel Chodoweicki . . 207
121. "Incroyable," by Horace Vernet 209
122. Fashion Plate for *La Mode*, 1830, by Gavarni . . . 209
123. Designs for Dresses for Mannequins, by Marjorie Grey . 211
124. Designs for Fashion Plates, by Helen S. Oliver . . 211
125. The Parts, Proportions, and Pleatings of the Folded Fan 214
126. Painted Silk Fan, by Ethel King (Mrs. George Gascoyne) . 217
127. Lace Fan presented to Queen Alexandra in 1903 by the Youghal Co-operative Lace Society 219
128. Lace Fan, designed by Frederick Vigers 219
129. Designs for Carved Wood Fan-Sticks, by Ethel King (Mrs. George Gascoyne) 222
130. Fan-Leaf (silk), by George Sheringham 224
131. Design for Painted Fan-Leaf, by Winifred Davison . . 224
132. Design for Fan-Leaf, by the Author 224
133. Queen Mary's Coronation Fan, designed by the Author . 227
134. Court Train of Irish Needle Point Lace (Coronation Gift to the Queen) 229
135. Poster for the "Woman in White," by Frederick Walker, A.R.A. 233
136. Poster for *Black and White*, by Sir Hubert von Herkomer, M.V.O., R.A. 233
137. Posters, by Louis Rhead 235
138. Poster for "A Comedy of Sighs," by Aubery Beardsley . 237
139. Poster for "Don Quixote," by the Brothers Beggarstaff . 237
140. Poster for "Peter Pan," by Charles A. Buchel . . . 239

"Every wyse man that wysely would learn anything, shall chiefly go about that whereunto he knoweth well that he shall never come. In every crafte there is a perfect excellency which may be better known in a m n's mind than followed in a man's deede. This perfectnesse, because it is generally layed as a broad, wyde example afore all men, no one particular man is able to compasse."

ROGER ASCHAM.

MODERN PRACTICAL DESIGN.

CHAPTER I.

PLANT FORM AS THE BASIS OF ORNAMENT.

FIG. 1.

THERE is a principle in Nature, all-pervading, insistent, universal in the works of the Creator, though not always obvious, since Nature has other things to do besides being ornamental, which has during all periods of the world's history found its expression in the works of the greater artists, and, although it was well understood in the great times of art, has during recent periods been to a large extent lost sight of, or allowed to fall into desuetude.

I refer to the ornamental or decorative principle, as much a natural fact, and playing as important a part in the general economy of Nature as any other fact or system of facts.

The clear perception of this principle is, indeed, vital to art; it formed the dominant feature of all old art, and it is the loss of this ornamental perception that has put so much of modern art out of tune with the works of Nature. It is not, however, to art generally, but to ornament in particular, that the present inquiry is directed. A

systematic study of plant form, if it became at all prevalent, would undoubtedly tend towards the formation of a new style of ornamental art, many of the generally recognised and fundamental laws of design by which we have hitherto been guided would certainly disappear, and their place would be taken by others, perhaps of a greater complexity, but possibly also in the direction of a greater simplicity and reticence.

I shall endeavour to show, therefore, in the following pages, that with a sufficiently careful selection, ornament, the finest ornament, already exists in Nature, and that the different conventions adopted in ornamental art at various periods are mainly in the direction of simplification, and were necessitated by the exigencies of the method employed and the limitations of the material.

To say that ornament exists in Nature is to state only a part of the truth; it is everywhere about us, in the commonest weed that grows, in those strange familiar plants that we see before us every day and never really observe. "Oh," we are in the habit of saying, "that is a common thing, it is of no interest," and on the rare occasions when we really consider these things they immediately assume a new aspect, and we wonder we had neglected to observe their beauties before. With open eyes, and a sufficiently lively sense of the abundant wealth of decorative suggestion in Nature, the nearest ditch bank will provide enough ornamental *motifs* for a lifetime. Nay, it would not be difficult to show that the budding lines of the sycamore growing outside my window, dancing in the sunlight, contrasted with their brown stems, are ornamental in the highest degree, though not presented in any ordered sequence, and although the decorative wonder of their detail is obscured by being at some distance from the eye.

Indeed the rule appears to be, the commoner the plant or object, the more its decorative qualities are insisted upon.

Could anything, for example, be more ornamental than the Dandelion—the serrations of its leaf, resembling the lion's tooth, from which the plant derives its English name, *Dent-de-lion*—or the construction of its involucre?

The little flower form, of which illustrations are given (see page 202), is not, as might naturally be supposed, taken from some old-world Sicilian damask, nor is it a drawing of some unfamiliar tropical plant, but just the little Canary Creeper (Canariensis), growing anywhere and everywhere.

The White Dead Nettle also, Lamium Album (Fig. 2), with its wondrous whorl of flowers, suggesting some strange Byzantine or Gothic capital—would it be possible to find anything more fantastic or surprisingly piquant? A well-known botanist describes this plant as being "extremely ornamental, but so abundant that it is generally considered a troublesome weed."

It would be superfluous to multiply instances. The qualities that these things undoubtedly possess, it is the business of the artist to transcribe, in the language which is his peculiar heritage.

There appear to be two ways or methods of going to work in order to obtain ornament from plant form; firstly, to make drawings in full light and shade of such plants as offer fine examples of composition of line, or possess ornamental qualities in their *relief* as distinct from their *outline;* and, secondly, to make outlines, diagrams, silhouettes, &c., of such plants as are decorative in their outline rather than in the form of their relief.

The aim in making studies should be *the whole plant, from root to seed.* This is obviously not always feasible, but studies of plants for decorative purposes should give:—

1. The general growth of the plant as seen in perspective.
2. A plan and profile of the leaf.
3. The floral bud in its various stages of growth.
4. A plan and profile of the flower.

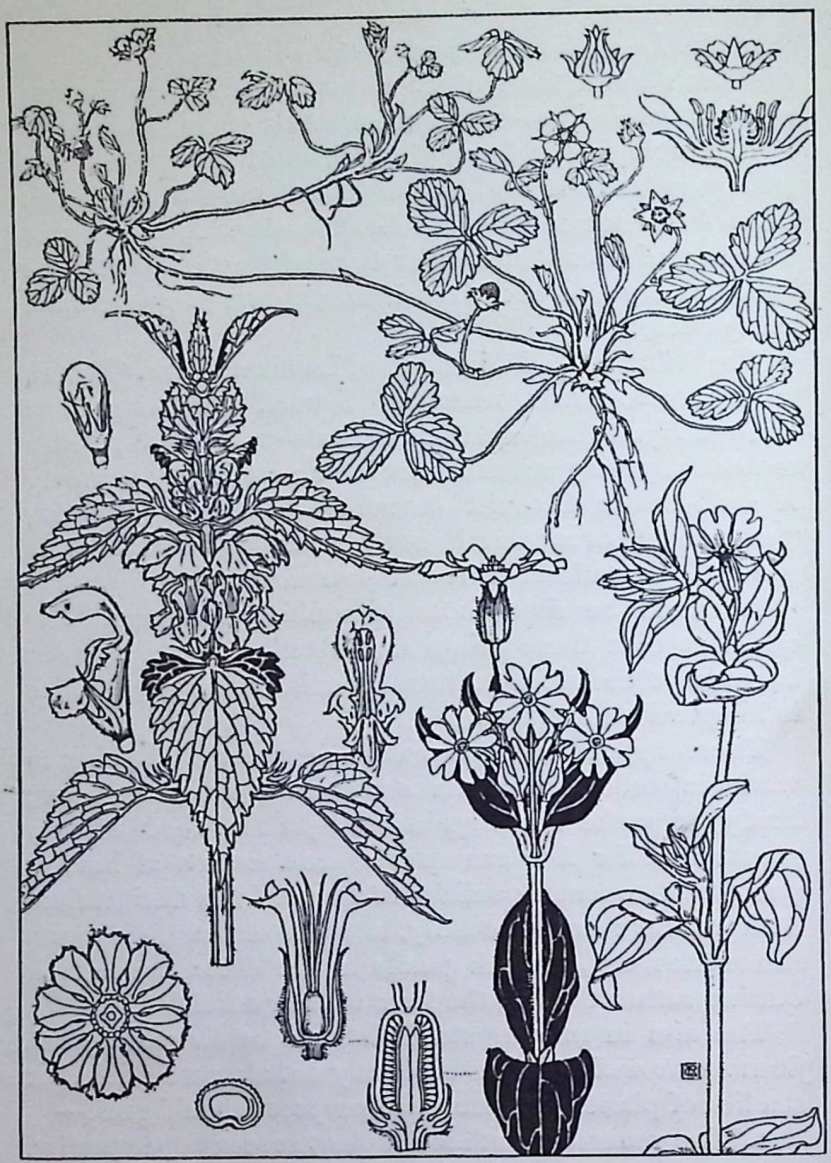


FIG. 2.—Wild Strawberry, White Dead Nettle and Campion.

5. The fruit and seed in all cases that offer decorative suggestion.

Studies should also be made of such details as are decorative in their character—the opening of the leaf-bud, the young shoots and tendrils (if any) of the plant, many examples of which are given and considered in the following pages.

The student should cultivate his powers of observation. Ornamental suggestion is often obtained from abnormal and unusual growths: from the accidental situation of a plant and the way its growth is affected by light, or the absence of it; but though a master of design may be able to make good use of such material, it is not recommended to students.

I propose, therefore, to consider from the decorative standpoint the different parts of the plant in their proper order, as the root, the stem, the bud, the leaf, the flower, the fruit and seed.

THE ROOT.

The root is that portion of the plant growing downwards from the neck, usually into the earth. It may be said to be the base supporting the column of the vegetable structure. Its functions are twofold: firstly, to obtain a firm grip or foothold for the plant, to the earth, or to whatever else it may happen to grow upon. Secondly, to attract and to convey to the plant the liquid matter constituting its food. Its general or specific character is avoidance of the light, in marked contrast to the rest of the plant, which seeks all the light it can find. The general decorative principle, however, of its growth is the same as that of the upper portion of the plant—viz., that of tapering, a principle universal in nature, and, when one considers it, a necessity. A plant, like an animal, usually consists of a main stem or trunk, throwing off branches or limbs which taper more or less to a point.

This principle is most marked in the root; necessarily so, since it must insinuate itself into the ground; it must overcome the obstructions offered by the ground; it must cover a certain area in its foraging for sustenance.

The seed is ordinarily provided with a skin covering called the *testa* (Fig. 3)(9). The embryo consists of three parts: the radicle or young root, which always grows downwards, in whatever position the seed may happen to be placed; the plumule or young shoot, which invariably grows upwards; and one or two cotyledons, as the case may be.

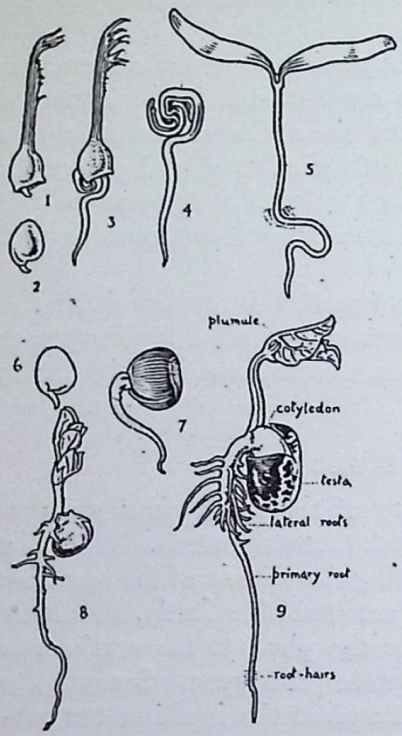


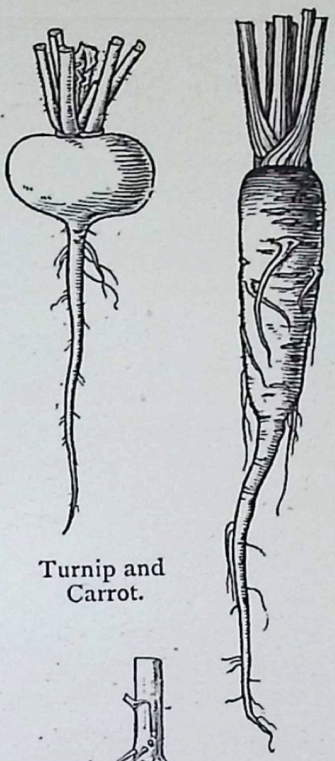
FIG. 3.—(1) to (5), Germination of Sycamore. (6) and (8), Pea. (7), Nut. (9), Kidney Bean.

The *modus operandi* of germination, to take the Sycamore as an example, is something like the following:—The seed falls to the ground, often travelling with the aid of its wings assisted by the wind, a considerable distance from the parent tree. It becomes covered, or partially covered, with the light mould, by the action of the wind, by accident or other means; the damp earth causes the seed to swell, and at the psychological moment, the radicle, with something of the action of a corkscrew, insinuates itself into the ground—takes possession, in fact, *Je suis, je reste.* The stem of the two primary leaves already formed within the

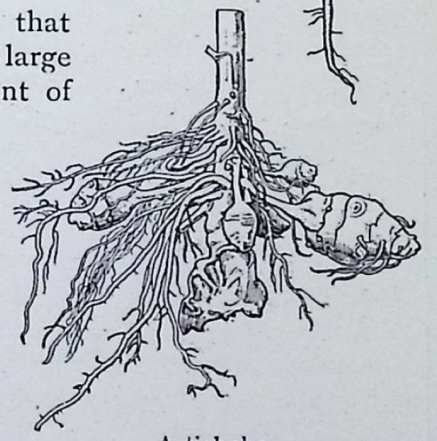
husk quickly unfold themselves, easily throw off the husk, as one doffs an old coat, and the plant is established (Fig. 3), (1—5).

The root is divided into irregular branches called fibres; it never has any leaves upon its surface, nor scales, which are imperfect leaves, neither has it any buds, except accidentally.

The root of a large tree answers almost exactly to its branches, and sometimes the root is almost equal in bulk to its branches, and occupies an almost equal area. A Poplar, for example, will send out lateral root shoots almost equalling in length the height of the tree. It will readily be realised that this is a necessity, as a large tree offers a great amount of resistance to the wind, so that if the tree had not a firm grip upon the earth it would be uprooted by the first storm that blew. Moreover, the amount of sustenance necessary for a large tree is considerable.



Turnip and Carrot.



Artichoke.

FIG. 4.

The simplest class of root is composed of stringy fibres, of varying length, that grow without branching. Such roots are found in most bulbous or onion-rooted plants. A root system

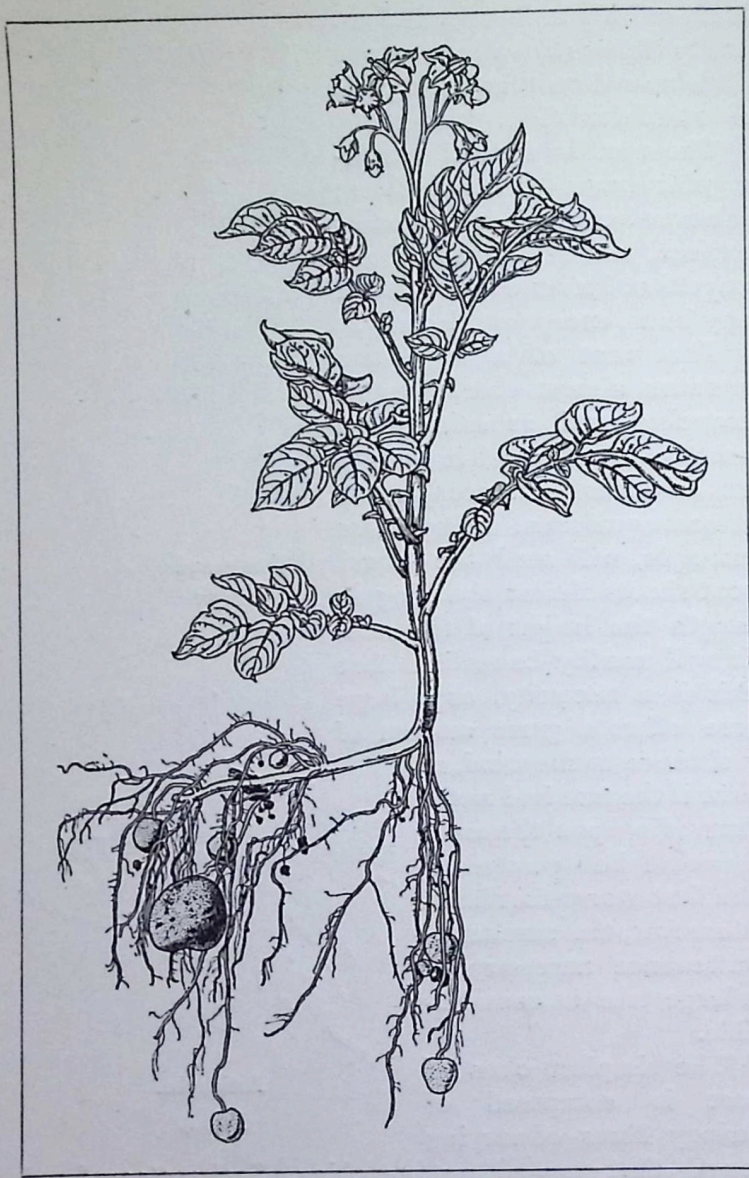


FIG. 5.—Potato.

in which there is no main root, and in which the several branches throw off smaller branches more or less evenly distributed throughout the root, is described as fibrous.

Many root systems have a principal or main root throwing off smaller branches laterally. These lateral roots, as well as the main root, develop root hairs near the tip, more or less numerous according to the conditions under which the plant is growing; in moist ground they would be more abundant than they would be in dry soil. The tips of the roots are protected by little root-caps to enable them to push their way through the soil without injury.

In some plants the primary or principal root is developed enormously in comparison to the fibrous portion, and varied in shape, as in the Carrot, Parnsip, Turnip, Radish, the two latter being globular. In each of these cases, as before stated, the root is more or less fibrous also.

Other plants develop fleshy growths of various shapes at their root, composed of starchy, gummy or similar matter, and acting as reservoirs of nutriment for the future support of the plant. These are called *tubercles*. Such plants are the Orchis, in which the tubercles are more or less egg-shaped; the Lesser Celandine (Fig. 7), in which they are fig-shaped; the Artichoke and Potato (Figs. 4 and 5), in which the shapes vary and are called *tubers*. In each instance the root is fibrous as well as tuberculous and tuberous. Botanists, however, draw a distinction between *tubercles* and the tubers of the Potato and Artichoke, from the fact that the latter develop buds on their surface from which new plants spring. Botanically, therefore, tubers are classed as short, thick, underground stems, arrested in their growth.

The general character of the root is therefore fibrous. All roots are more or less fibrous, since it is by means of these that the plant obtains its nourishment from the ground.

There is another class of roots, called aerial or

adventitious roots, from the fact that they root above the ground instead of beneath. To this class belong the Ivy (Fig. 10), that climbs by the aid of its aerial roots, and will be considered under the head of climbing stems; the different tropical Orchids obtaining their nourishment from the air, and not at the expense of the trees upon which they grow.

The decorative principle of *development* is universal in Nature as well as art. This principle is as applicable to the root as to other parts of the plant, and is reduced to a formula in the accompanying diagram (Fig. 6). The straight line (1) represents all simple roots that grow without branching. The meander (2), throwing off branches on either side, represents all fibrous roots in which the branchings are evenly distributed. The third illustration (3), in which the line is thickened at intervals, represents those plants having a primary or principal root, or in which such primary root is developed, as in the Carrot, Turnip and others. In the fourth (4), an entirely new decorative *motif* is introduced, indeed the only possible new *motif*, that of the circle or spot. This represents all tuberculous plants as well as tubers. Such abnormal growths as those of the Potato or Artichoke may present to the botanist difficulties of nomenclature or classification on account of the plants developing seed, or growths which act as seed, at both extremities of the plant. No such difficulties, however, present themselves to the ornamentist: the tubers of Potato belong to the root, and partake of the nature of the root, the eyes or buds only represent a decorative development of the tuber. The scale of deco-

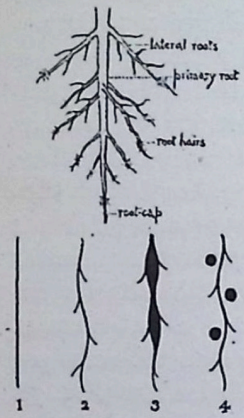


FIG. 6.—Diagram of Root Systems.

rative development is absolute; it does not admit of any question, it represents the general system of Nature.

The root, while presenting perhaps less variation of form than any other part of the plant, may be made of great decorative value in a design. Its introduction (in nature it is almost always hidden beneath the ground) gives a sense of completeness to the plant and to the design; its character is almost always in strong contrast to the rest of the plant. Even in large trees in which the general growth of the root is similar to the branches, the entire absence of leaves makes the contrast with the rest of the tree strongly marked. Many instances might be cited in old art in which the root forms part of the general decorative scheme. In the present work the title-page may be referred to as an example.

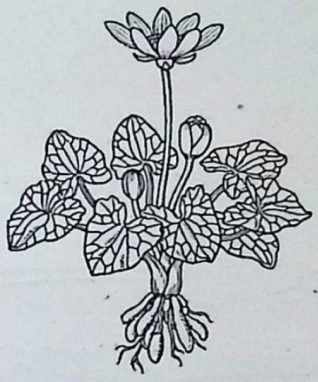


FIG. 7.—Lesser Celandine.

THE STEM.

The stem is that portion of the plant springing directly from the root, generally upwards, and bearing branches, leaves, flowers and fruit. Its office is to distribute into the various portions of the plant the food fluid obtained by the roots from the earth, which fluid is in fact the blood of the plant, and serves as its means of support.

Stems may be divided into two main classes—simple and articulated. The former are parallel, or nearly so, throughout their entire length, as those of Groundsel, Grass of Parnassus, Flowering Rush, Sun-dew and others. They have no joints or nodes, and consequently do not give off branches or leaves.

The long cylindrical stalks bearing the compound

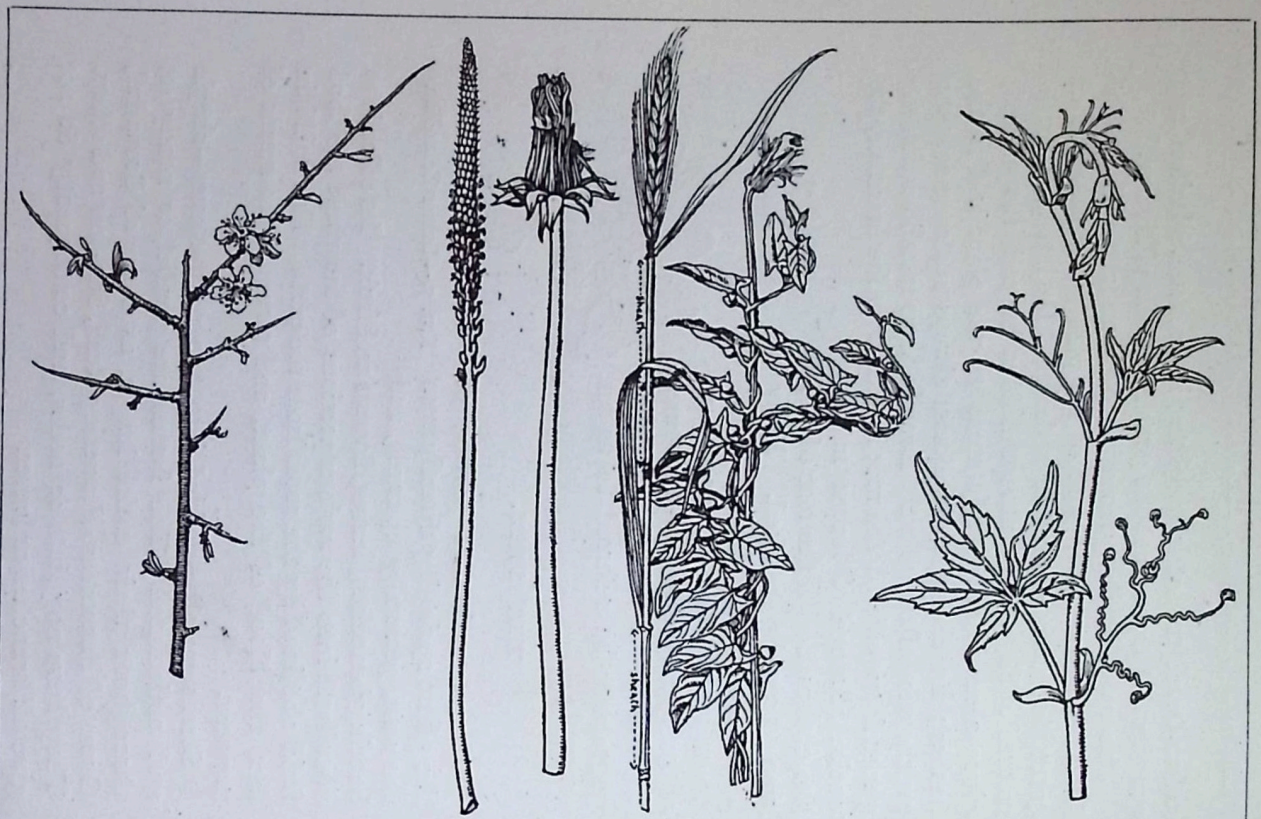


FIG. 8.—Stems and Stalks. Blackthorn, Groundsel, Dandelion, Wild Barley, Bindweed, Virginia Creeper.

flowers of the Dandelion, and forming such a prominent feature of the plant, are properly *flower-stalks* and must not be confounded with *stems.*

The Dandelion, in fact, belongs to a large class of plants whose leaves spring directly from the neck or root, and whose stems are practically non-existent. These plants (of which the Lesser Celandine is another example) are extremely useful in decoration. They have either a central flower-stalk or a bundle of flower-stalks bearing flowers, and surmounted by a circle of leaves (Fig. 7).

Another variety of the simple stem is in bulbous or onion-rooted plants. These develop fleshy scales or incipient leaves at the root, forming a bulb and enclosing a short stem bearing a bud or buds, from which the leaves and flowers spring. Such plants are the Hyacinth, the different Lilies, the Snowdrop, the Onion and many others.

The *Corm*, of which the Crocus is a familiar example (Fig. 14), is a variety of the bulb, of which it is really a development. The white portion in the bulb, immediately above the root fibres, is developed enormously, and the fleshy scales disappear. The stem proper arises from the corm, bearing a bud or buds consisting of a succession of sheathing leaves, a few green leaves, and the floral leaves enclosed in a sheath. Simple stems are usually soft, and are generally confined to plants which exist only for one season.

Articulated stems have joints or notches at regular intervals from which the buds spring. These are botanically termed *nodes* (Latin, *Nodus* a knot), the spaces between the nodes being called internodes.

These nodes bear the same relation to the plant as the joints of the human frame bear to the body and limbs, and are relatively as important, since they form its constructional parts, and should therefore always receive the most careful attention of plant draughtsmen.

Perhaps the simplest examples of articulated stems are

those of the common Grasses or of Bamboo—the latter really an enlarged grass.

In some plants the articulations are considerably swelled and form a feature, as in Cranesbill and Carnation.

Articulated stems are again divided into the following :—

1. Erect stems, including all trees, shrubs, and such plants as grow upwards at right angles from the ground, forming by far the largest class.

2. Climbing, twining or clinging plants—*i.e.*, those plants whose stems are not sufficiently strong to sustain their own weight, but are dependent upon others for support, such as the Pea, Hop, Vine, Vetch, Tare, Honeysuckle, Clematis, Convolvulus and others. These often develop thread-like appendages, tendrils or feelers, which cling to any support they happen to come in contact with (Figs. 8 and 9).

3. Runners, as the Wild Strawberry, that from the parent plant send out a wire-like appendage, running for some little distance along the ground, and at a joint or leaf node send down roots into the earth and develop a fresh plant (see illustration Wild Strawberry, Fig. 2).

4. Rhizomes (Fig. 11), that grow along underneath the ground instead of on the surface, developing roots and fresh plants at intervals, as in the Couch Grass, the Iris, in which the stem is thick and short, the Coltsfoot and Bracken.

5. Tubers, as the Potato (Fig. 5), botanically classed as an underground stem on account of its giving off buds, from which new plants spring.

Climbing stems divide themselves into four classes: 1. Those that especially entwine round a support, and are entirely dependent upon this spiral movement for their upward progress; such are the Hop, Clematis, Convolvulus, Kidney Bean, Honeysuckle and others. 2. Those provided with irritable organs, such as tendrils and flower peduncles, and which clasp any object with which they

come in contact; such plants are the Vine, Bryony, Passion Flower, Virginia Creeper. 3. Hook or claw climbers, as the Bramble and Wild Rose. 4. Those plants that climb by the aid of aerial roots or rootlets, as the Ivy (Fig. 10). Of these four subdivisions the first is by far the most numerous.

Revolving stems become also spirally twisted on their own axes. This fact is shown in the illustration of Bindweed (Fig. 8). This affords a very useful *motif* in ornament, and may well be made the most of, since it imparts an added strength and richness to a design.

FIG. 9.—Vine Tendrils.

Tendrils must be considered in connection with the subject of stems, to which they really bear a very close relation; they are extremely sensitive to contact, and are used exclusively for purposes of climbing. There seems no reason why botanists should be at such pains to prove that they are modifications either of leaves, flower peduncles or stems. They form one of the distinct features of a plant. They are a means wherewith Nature has provided certain plants to enable them to adapt themselves to certain conditions of growth and environment.

The principle of development is as applicable to the tendril as to other parts of the plant. Tendril formation may be divided into two classes: 1. The simple or single-branched tendril, as White Bryony and Passion Flower; and 2, the compound tendril, which divides itself into two, three, five, or seven branchlets; the Vine, two or three,

as the case may be; the Pea, five; the Virginia Creeper, seven. Tendril growth, again, presents several variations. Tendrils may be modifications of leaves or appear at the extremity of leaves, as in the tropical Lily "Gloriosa Superba" and the Pea. They may be modifications of branches, as in certain Australian climbing plants, the tendrils of which are extremely ornamental suggesting the volutes of a Greek anthemion; or of flower peduncles, as in "Cardiospernum Halicacabum"; or they may be independent members springing from the main stem at the junction of a leaf stalk, as in Bryony, Virginia Creeper and Vine.

Twining plants, as well as tendrils, are of the greatest possible service to the ornamentist. The opportunities they afford for decorative treatment have always been taken the fullest advantage of by artists. The principle of their growth is that of the most beautiful of all ornamental *motifs*—viz., the spiral. In Egyptian art the Convolvulus is largely made use of, and is figured as twining round the stem of the Lotus. In Greek art, again, the spiral forms the base of the anthemion. The most perfect example, however, of the spiral in Greek art is the volute of the Ionic capital. Of the third class of climbing plants, that of hook or claw climbers, the Bramble and the Wild Rose are the most distinctive. The claws are sharp conical projections, originating in the bark, from which with a little pressure they may be broken off clean. The points necessarily bend backwards and downwards, since if they pointed upwards they would not only be of no service as hooks, but would prevent the onward progress of the plant. They appear at fairly regular intervals along the stem, and are pointed at all possible angles. They have a polished surface and are of a buff-brown colour, which contrasts pleasantly with the bright green of the young stem or with the purple colour of the stem of more advanced growth. The thorns of the Rose enrich

FIG. 10.—Ivy.

the stem ornamentally and are characteristic of the plant.

The fourth class of climbing plants is that climbing by the aid of aerial rootlets, developing along the whole course of the stem, of which class the Ivy (Fig. 10) is the most familiar and distinctive example; these roots, however, like the discs of the tendrils of the Virginia Creeper, never develop except upon contact with some object. They commence to develop at a node, usually at the second node from the termination of a branch, and continue about half the length of the internode, with spaces of about a quarter of an inch between, the internodes of the young shoots measuring on an average about an inch. They necessarily develop on the *under* side of the stem and resemble the legs of a caterpillar. The thicker stems of an old plant become covered with these rootlets, which vary in length according to the thickness of the stem.

The runner is one of the numerous means adopted by Nature for the increase and multiplication of the species and for the purpose of distribution over a larger area. The Strawberry, or *Strayberry*, is a well-known example (Fig. 2). The runner usually starts to the left, travelling for some distance over the surface of the ground, taking root at its apex or leaf bud, turning sharply backwards and again taking root, the plants forming the points of an irregular or Isosceles triangle. The runner dies in winter, leaving the young plants to grow alone and form new runners of their own during the succeeding year.

Rhizomes form a large and important class, of which several illustrations are given (Fig. 11). This class includes the Iris, Coltsfoot, Solomon's Seal, Couch Grass, Raspberry, Bracken and many others. The apex of the stem always consists of a bud, which is usually pointed, to enable the stem to insinuate itself along underneath the ground.

The principle of the rhizome or underground stem is

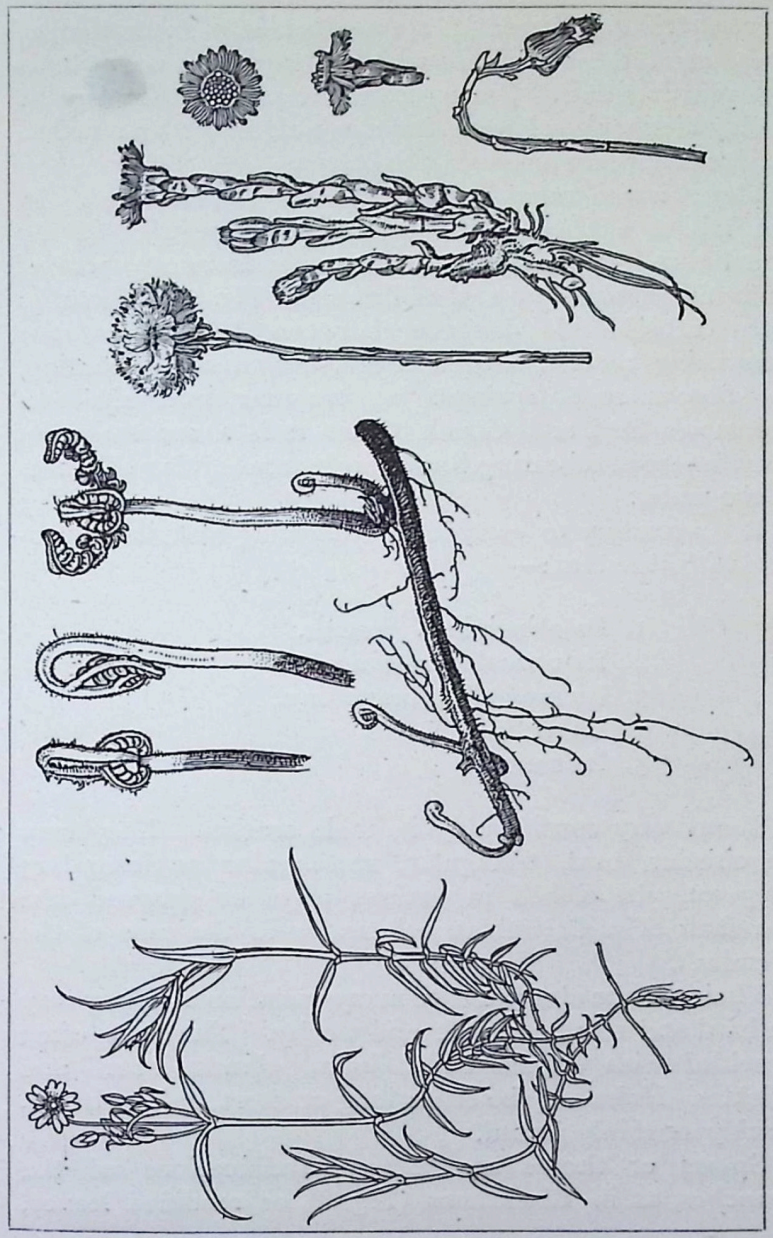


FIG. 11.—Rhizomes. Star of Bethlehem, Bracken, Coltsfoot.

precisely that of the aerial stem—that is, a succession of nodes and internodes, from which (always at a node) buds spring at intervals. Underground stems may therefore be readily distinguished from roots, which never bear nodes, buds, or anything answering to leaves.

The rhizome varies considerably in its character. In the Iris it is short, thick and fleshy, irregular in its growth, and throwing off fibrous roots from any part of its under surface. In the Bracken (Fig. 11) there is often considerable distance between the nodes, the stem being covered with a rough, brown scaly coating, the fibrous roots springing at irregular intervals. In Solomon's Seal and Couch Grass it is a succession of short internodes bearing brown scales and giving off roots at the nodes.

It is necessary to consider the following facts in connection with the stem :—

1. Its principle of growth.
2. Its articulation (if any).
3. Its method of branching.
4. Its section.
5. Its surface.

Stems vary considerably in their section. They may be circular, oval, triangular, rectangular or irregular; they may be ribbed in various ways or grooved like the shaft of a Corinthian column, as in the case of the Hemlock.

Their surface also presents many variations. They may be hard and strong or soft and woolly. They are often provided with organs called hairs, glands, scurf and prickles. Hairs may be either long or short, soft or harsh, thickly or thinly placed.

Spines or thorns are either modifications of the branches, as in Blackthorn (Fig. 8), or modified leaves,

as in Gorse. They must not be confused with prickles, which are of the nature of hairs, and originate in the bark or skin.

It will be noticed that in a large class of articulated stems the direction of their growth is alternately to the right and to the left from the node. This character is in some plants very strongly emphasised, as in some grasses, in Cranesbill and Carnation. It is, however, by no means a universal rule. The articulated stem of the Bamboo is practically straight.

Although the shapes of stems vary almost indefinitely, their general character is columnar, in contrast to the flat plane of the leaf. The leading idea of a stem, therefore, is that of a column or support. Stems may be called the body of a plant and form its constructional parts. It is scarcely possible to overrate their importance in a design, as the stem answers to, indeed forms, the leading lines of a piece of ornament.

FIG. 12.

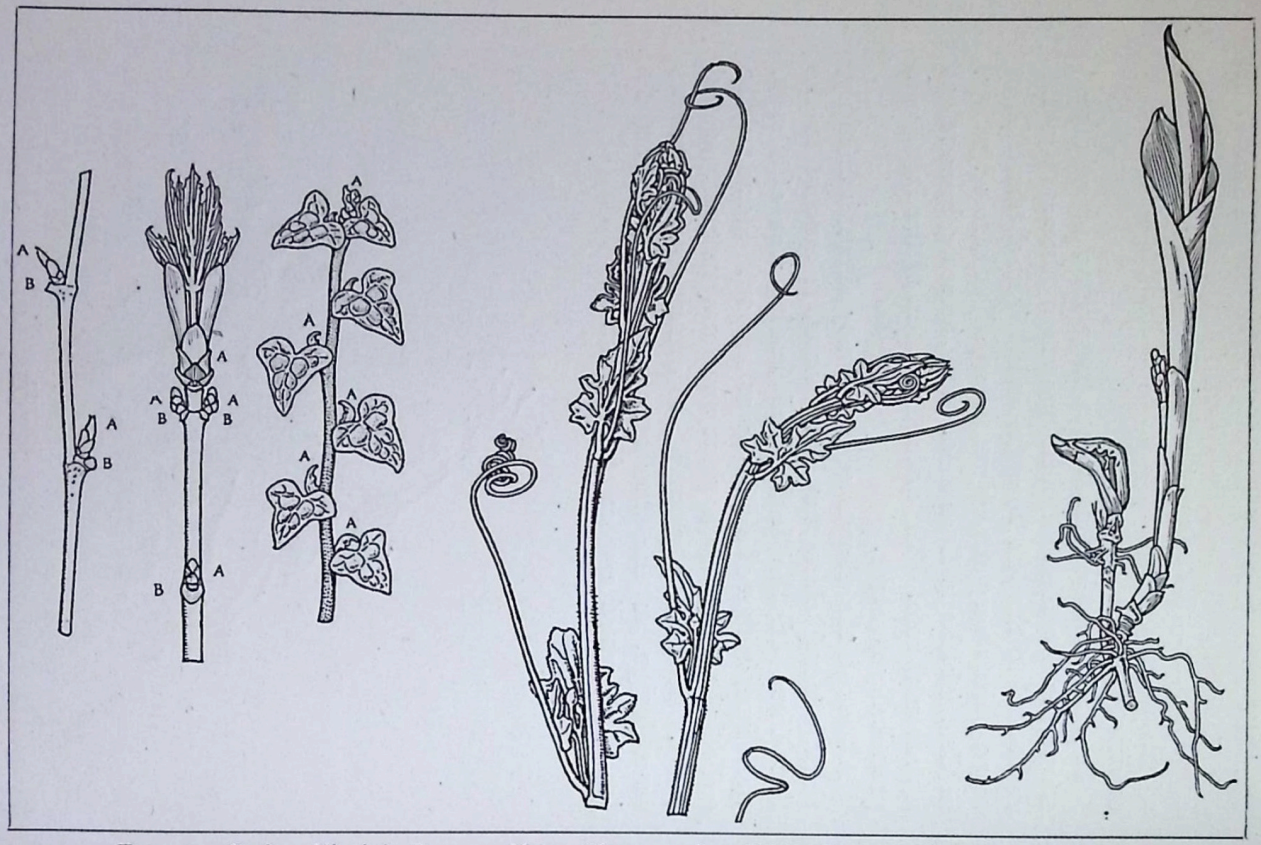


FIG. 13.—Buds. Virginia Creeper, Horse Chestnut, Ivy, White Bryony, Lily of the Valley.

THE BUD.

The plumule is the first bud. It consists, as all buds do, of the stem-like portion, bearing leaves, and, in some cases, the inflorescence also, surrounded usually by an envelope of scaly leaves, which serve as a protection to the young shoot against cold winds until it is strong enough to bear the variations of temperature. When these scales become fleshy it is then called a bulb. That of the Crocus, given in the illustration (Fig. 14, D), shows the bud just peeping through at the top.

Buds are of two kinds. The primary or apical bud, which always forms the termination of a branch, and the secondary or axillary bud, appearing at the junction of the leaf with the stem.

The alternating axillary buds are figured at A. A. A. A. in the illustrations of Virginia Creeper, Horse Chestnut and Ivy (Fig. 13). The little projecting planes marked B. B. in the former are the parts from which the previous season's leaves have been cast, and to which their stems were attached. In the illustration of Ivy the old leaves still remain, and the buds which will form its new season's dress are shown just peeping forth.

The chief characteristic of the bud is the almost universal symmetry of its arrangement—symmetry and regularity. Plant form is much more symmetrical than a casual observer would suppose, as the appearance of symmetry in its construction is to some extent obscured by the growth of the plant, by the action of light upon its leaves and flowers, drawing the parts of the plant this way and that, and by the effect of perspective. This accounts for the apparent confusion and almost endless variety and change which we see in Nature. This variety is indeed infinite, but it is founded upon, and built around, a few well-defined laws, which laws are universal and unchanging.

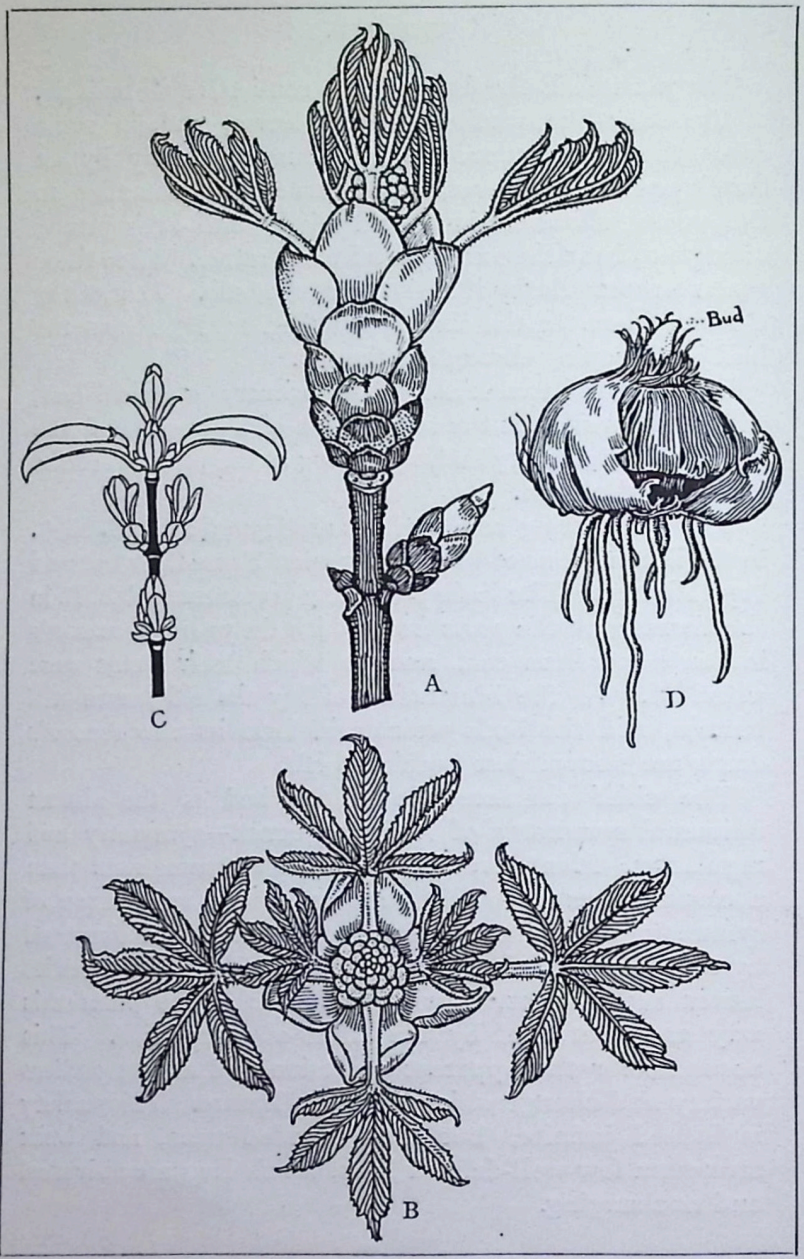


FIG. 14.—Buds. A, B, Horse Chestnut; C, Privet; D, Corm of Crocus.

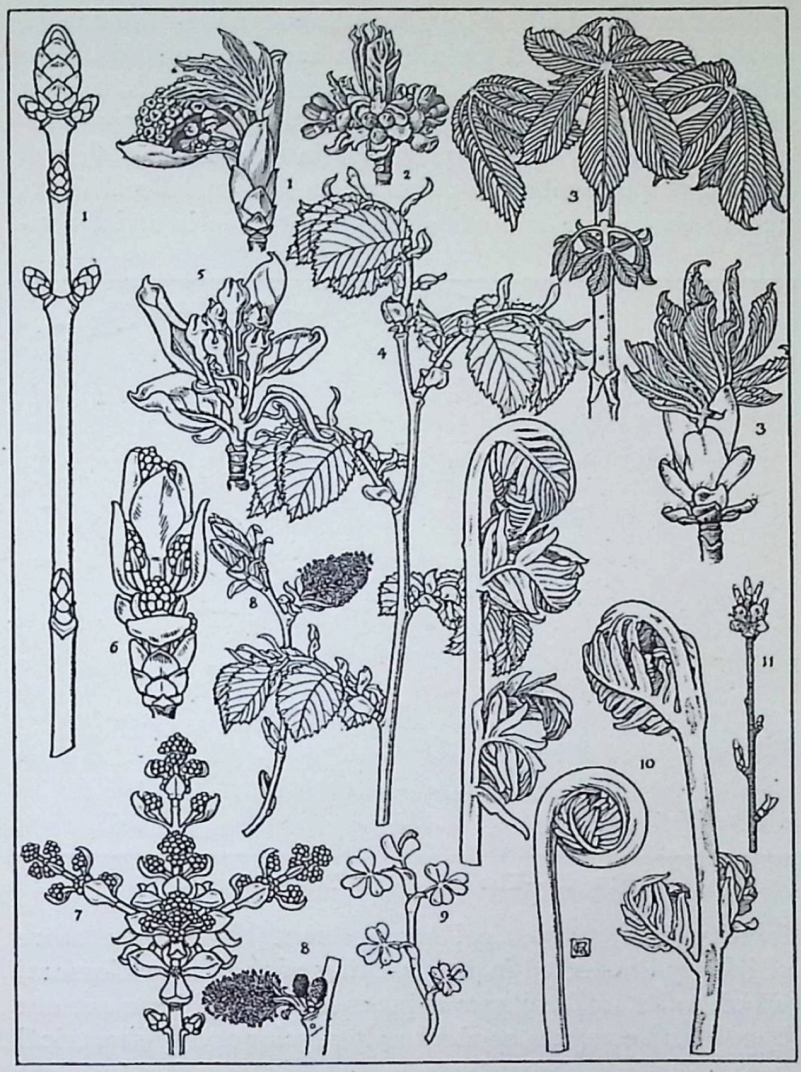


FIG. 15.—Spring buds.

1, Sycamore; 2, Cherry; 3, Horse Chestnut; 4, Elm; 5, Pear; 6, White Lilac; 7, Lilac; 8, Willow; 9, Shamrock; 10, Ferns; 11, Blackthorn.

If a budding branch of the Sycamore or Horse Chestnut be examined, it will be seen that, whether in the setting of the buds on the stem, the apical bud at the extremity,

and the axillary buds at regular intervals along the course of the stem, or whether a single bud is considered, in either view, front elevation or plan (Fig. 14, A, B), in either section, vertical or transverse, the symmetry is complete, practically as complete as in the human figure. This law of symmetry is universal in leaf and floral form, and in the general growth of the plant it is in strict con-

FIG. 16.—The Budding of Black Bryony.

formity with geometrical arrangement; it is even more strikingly illustrated in the budding of the Lilac blossom, which in its earlier stages appears as if it had been set out by rule and compass, so absolutely regular and symmetrical is each little bunch of buds, with their covering leaf, set at intervals on its stem. The basis of all floral form, as Owen Jones very well observes, is geometry. This may seem at first blush surprising, but it is nevertheless a fact.

The budding shoots of the White Bryony (Fig. 13)

furnish one of the most striking oramental *motifs* to be found in the whole of plant form. The tendrils are folded spirally like the spring of a watch, at regular intervals, neatly packed, and forming, with their covering leaves, a most remarkable piece of ornament, quite architectural in its character.

Buds are protected in various ways. In the Plane they are enclosed by the base of the leaf-stalk, which is hollowed out to form a little cup. In the autumn, at the falling of the leaf, the bud is exposed and has then its covering of scales to protect it.

The young bud of the Lilac bears a close resemblance to those of the Sycamore and Horse Chestnut, but in reality it is quite different, each scale representing a leaf-blade. The form of these scales presents a continuous development from the more or less semi-circular contour of the first pair, to the pointed heart shape of the perfect leaf (Fig. 15) (6), (7). In the Holly, also, the bud scales are young leaves.

THE LEAF.

The leaf is an expansion of the stem, and is essentially a flat plane, in contrast to the rounded stalk. It consists usually of two parts, the stalk and the blade. Some leaves, however, have no stalks, but spring directly from the stem, as in the case of grasses and kindred plants. In these cases they are called *sessile*.

The first leaves of the plant are the cotyledons, and always differ in character from the foliage leaves that follow.

Leaves present many variations in their shape: some are like arrows, others like hearts; some are like lances, others like shields; some are like feathers, others like wings; some resemble the fingers of the hand, others are fan-shaped.

Some are divided upon the same plan as that determining their primitive form, in which cases their appearance is very different. For example, the Clover is *ternate*,

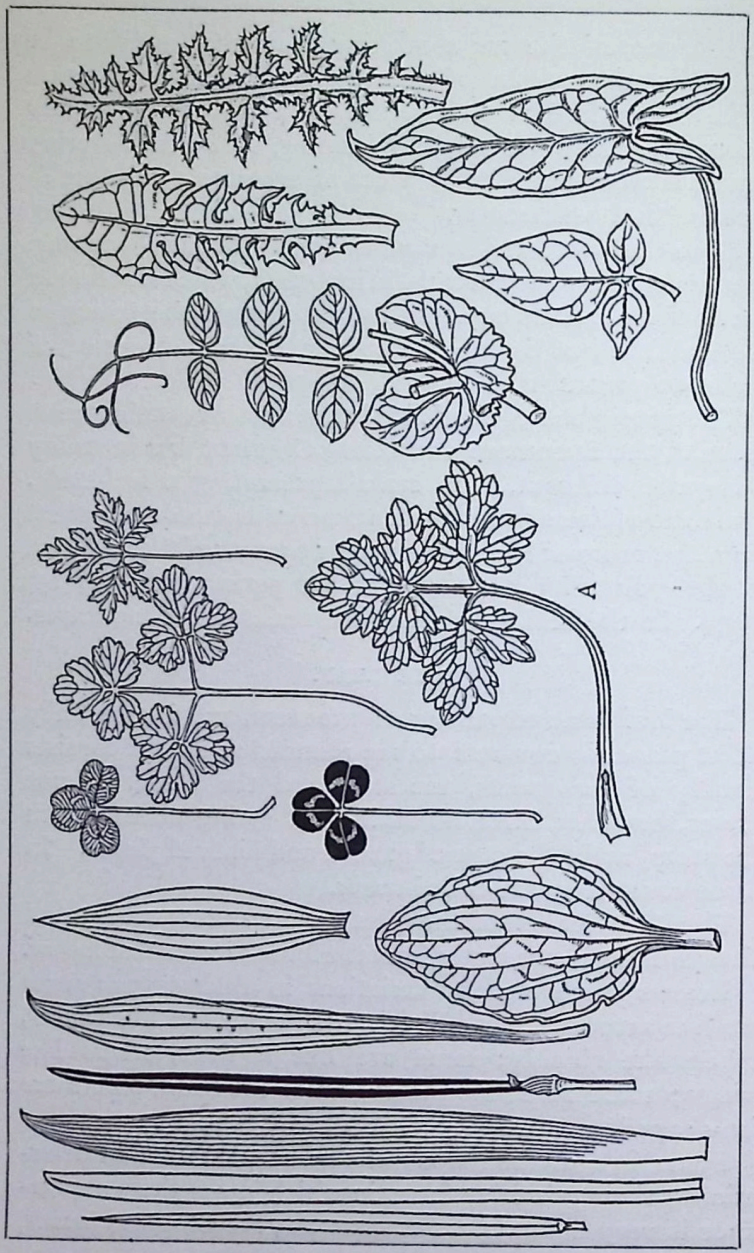


FIG. 17.—Various Types of Leaves.

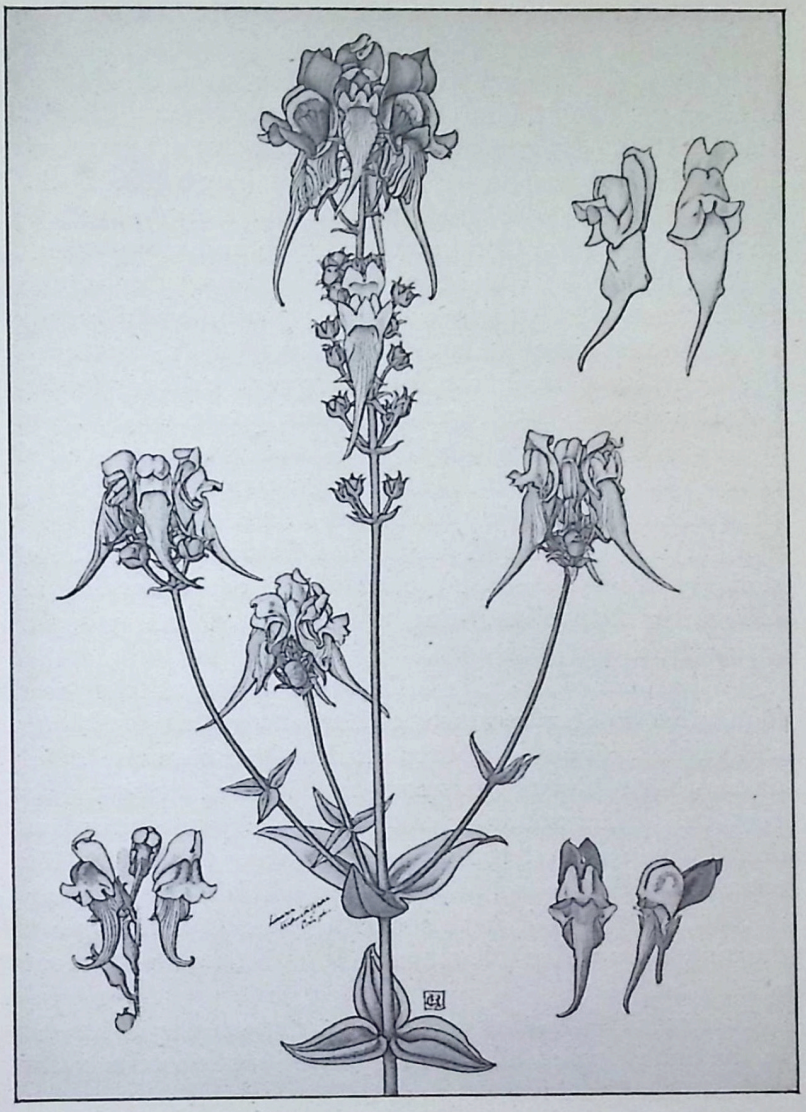


FIG. 18.—Linaria.

a simple trefoil. When each of the three divisions is divided up, the leaf becomes *bi-ternate*, as Columbine.

The same principle of division may be carried further, as in Cranesbill, which has five divisions, each of which is divided up, and still further as in Larkspur and Monkshood. If the division of leaves is carried much further it is called *de-compound* or *supra-decompound*, as in Hemlock.

In another class the leaflets radiate from a common stalk; such are the Horse Chestnut, the Lupin and many others.

Another fact in connection with leaves very important to designers is the principle of their growth, or the setting of the leaves on the stems. If leaves grow in pairs upon the same level, as in the Pea, they are called *opposite*, but if more than two leaves are opposite to each other on the same level, as in the Goose Grass, they are called *verticillate*. If, however, the leaves grow one a little above the other, as in Ivy, they are called *alternate*.

A very large class of leaves arises from the base of the stem, or from the root stock; these are described as *radical*, the Dandelion being a well-known example, the Daisy (Bellis perennis) also.

As the human figure is built upon a bony skeleton or foundation, so a leaf is constructed upon a system of ribbing and veining. This is always extremely ornamental, and possesses as much character and individuality as its contour. A fact not sufficiently realised by modern plant draughtsmen is that the veins are always carried to the *extreme edge* of the leaf, as in Nature. With the Japanese it is different, and it is this which gives Japanese plant drawing its peculiar character. It is a frank statement of a natural fact.

There are two leading principles in the veining of leaves. In the one the veins all start from the junction of the leaf with the stem, and run on more or less parallel lines to the point of the leaf; in the other there is a principal rib, from which smaller ribs or veins radiate, either opposite

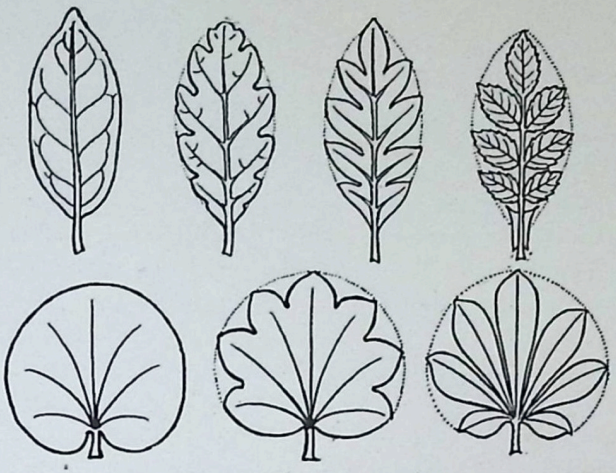


FIG. 19.—Development of Contour.

to each other or alternately, on the principle of tangential junction. These two systems may be said to represent two opposite poles; but as Nature never does things by fits and starts, but always proceeds upon a graduated scale of development, there are systems that partake of the character of both, and serve to bridge over the gap between these two opposite systems.

The first of these, which may be called the radio-parallel system, is that adopted in the ribbing or piping of the Acanthus leaf of the well-known Corinthian capital, in fact in the ribbing of all Renaissance ornament.

An important subject in connection with leaves is that of the growths, often forming on the leaf-base, at the foot of the leaf-base, or on the stem just below, called by Linnæus *stipules*, and by the English botanist Grew (1672) *interfoils*, which latter term would seem to be more generally expressive of their character. In some instances these interfoils are reduced to an adnate sheath at the base of the leaf stalk, as in the trifoliated leaf given in Fig. 17, A. In Wild Strawberry these sheaths develop two points, like wings, which give a decorative finish to the stalk, contrasting

the whole length of the internode, imparting, especially in the case of the Everlasting Pea, a very remarkable and individual character to the plant. In this latter instance two pointed lateral spurs are formed at the nodes. In the Thistle the principle is the same, although the appearance is very different from the undulating and spiny character of the leaf. This dressing up of the stem of the Thistle offers an extremely valuable ornamental *motif*, which does not seem to have been sufficiently taken advantage of by designers. A stem may be greatly enriched ornamentally by this means, and the principle suggests many variations of treatment.

There are also those plants in which the leaf is sheathed round the stem, as in many grasses—Wheat, Barley, &c. The leaf springs from a node, is ensheathed round the stem to the next node (Fig. 8), at which point the true leaf springs. Small lateral spurs are often found at the base of the leaf.

Bracts are covering leaves upon the flower stalk. They may enclose a single flower, as in Snowdrop, or a group of flowers, as in the Wild Arum ; in this latter case it is called a *spathe*. The enclosing leaves which form around the flower-bud of the Horned Poppy may be said to be of the nature of bracts. This principle of enclosing leaves or sheaths has been reduced to a convention in Renaissance ornament. They are technically called *nests*, and are indispensable to the continuity of ornamental growth. They are formed at intervals along the stem, and serve as points from which the foliage ramifies, and from which new branches spring. The Horned Poppy offers valuable ornamental suggestions of this sort. These nests are constructed precisely on the same principle as their ornamental prototype, though the character of their serrations as well as their ornamental canstruction is vastly more varied.

The texture of leaves also presents many variations. In some it is hard and shiny, as in the Laurel ; in others it is soft and woolly, as in Mullein.

Many leaves are also provided with hairs more or less obvious, as in the Gourd and Cucumber; with sharp prickles, as in the Holly, Thistle and others; and in the case of some insect-eating plants, such as the Sun-dew; with tentacles, that close round any living organism coming in contact with the leaf.

It will thus be seen that leaves present an almost indefinite number of variations in their contour and general character, a variation so great that it becomes difficult to obtain a grasp of their general decorative development; little more can be done than to point out their leading characteristics.

There are also plants in which the stipules are abnormally developed, and in which the leaves are non-existent, or more correctly speaking, modified into tendrils, the stipules taking the place of the leaves; such a plant is the Lathyrus or Wild Pea. This, however, is the botanical view. From the decorative point of view they are leaves.

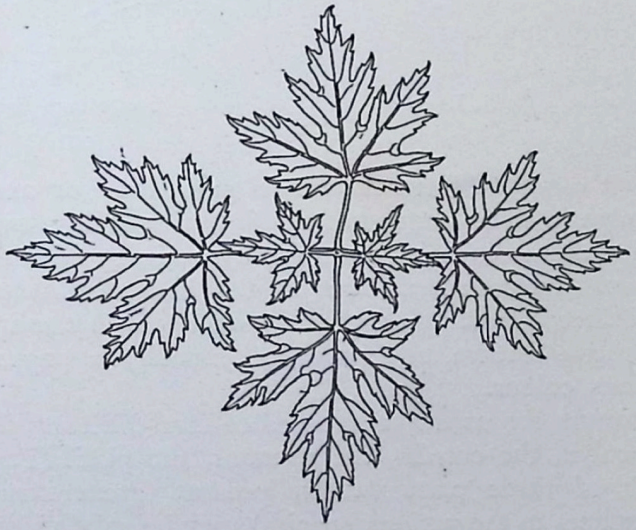
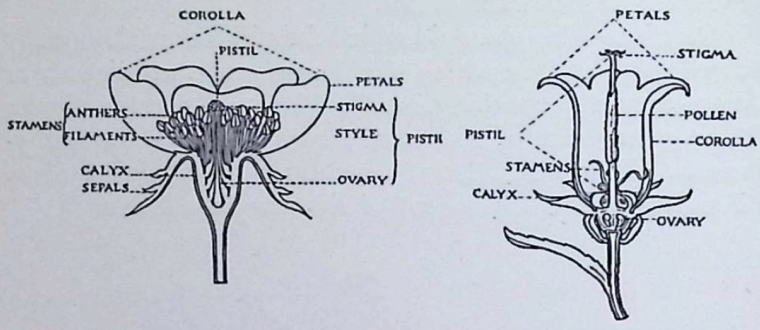


Fig. 21.

THE FLOWER.

The flower is that portion of the plant containing the organs of reproduction. Its primary object is the propagation of its species. It has, however, another office, and one in which we as artists are more immediately concerned: that of beautifying the earth, and supplying the colour note of needful contrast. It is the crowning glory of the plant, the culmination of Nature's ecstasy, the symbol of returning and recurring summer.



Wild Rose. Canterbury Bell.

FIG. 22.

Most vegetable forms flower in some way or another, although in some large trees the flowering is less evident. Their inflorescence is, however, a necessity of their existence. In some trees, such as the Horse Chestnut and the different fruit trees, the blossoming is a remarkably decorative feature, and provides annually a pageant of glorious colour.

Flowers are usually composed of four different parts—the calyx, the corolla, the stamens, the pistil (Fig. 22). Each of these parts (which present great structural differences in the various species) may be subdivided, and the result put in tabulated form as follows :—

Flower
- Calyx, consisting of Sepals.
- Corolla ,, ,, Petals.
- Stamens ,, ,, (Filaments. Anthers.)
- Pistil ,, ,, (Ovary. Style. Stigma.)

The calyx is a whorl of leaves called sepals, which may

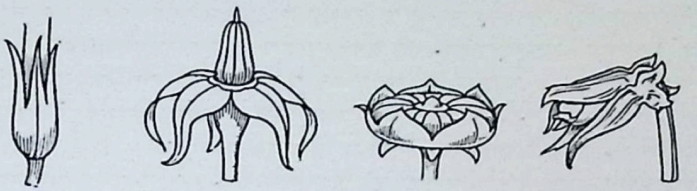


FIG. 23.—The Calyx—different types.

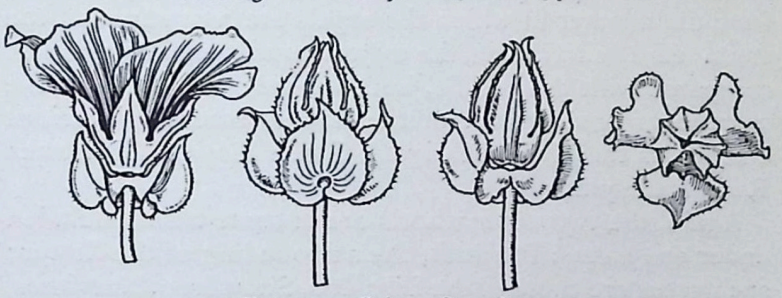


FIG. 24.—Cobœa Scandens.

be either separated from each other (polysepalous) or united at their edges so as to form a cup (monosepalous). It is usually green, and is always on the outside of the flower. It may, however, be of a different colour, as in the Fuchsia, which is red, pink or white (Fig. 26). It serves as a further protection to the young flower after it has escaped from the bracts of the bud; and also as a base upon which the flower proper is formed.

Its variations of form are as follows:—1. Tubular, when it forms a kind of tube or sheath, as in the Tobacco Plant

(Fig. 23, A) or Cornflower. 2. Rotate, when it has a short tube with a spreading border, resembling the nave and the spokes of a wheel, as in the Nightshade (Fig. 23, B). 3. Cup-shaped. 4. Campanulate, or bell-shaped. 5. Labiate, when its parts form two distinct lips.

The calyx is also said to be regular when its parts are equal, as in the first three examples given; irregular when they vary in size and shape, as in the Heartsease (Fig. 23, D).

The manner in which it is folded over the bud of the flower before expanding is called its aestivation, and is generally of two kinds—valvate, when the edges of the sepals join exactly, as in the Mallow; imbricate, when they overlap each other, as in the Dog Rose.

The form of the calyx varies abundantly, but its general specific character is that of a cup holding the flower. The leading decorative principle is necessarily that of radiation, from the manner in which the sepals are ranged round the stem. As a general rule, the calyx is small and insignificant compared with the corolla, but in some cases they are the most conspicuous part of the flower, assuming various colours, as the Marsh Marigold, Globe Flower, Christmas Rose, Larkspur.

Again, the two outer whorls are in some cases included under one name: Perianth, the surrounding of the flower; such cases are those of the Lily, Iris, Snowdrop, Narcissus, &c., the two latter cases assuming the form of a bell or trumpet within a whorl of outer leaves.

There is still another distinction—*i.e.*, *compound flowers*—in which each flower is in reality a bundle of individual little flowers or florets, each performing its own functions and bearing seed. In these cases the series of bracts round the broadening out of the stem at its junction with the flower, and what would ordinarily be the calyx, is known as the *involucre*, or envelope. The Daisy, Sunflower, Dandelion, and all flowers showing a disc with radiating petals are compound flowers, and in these cases the

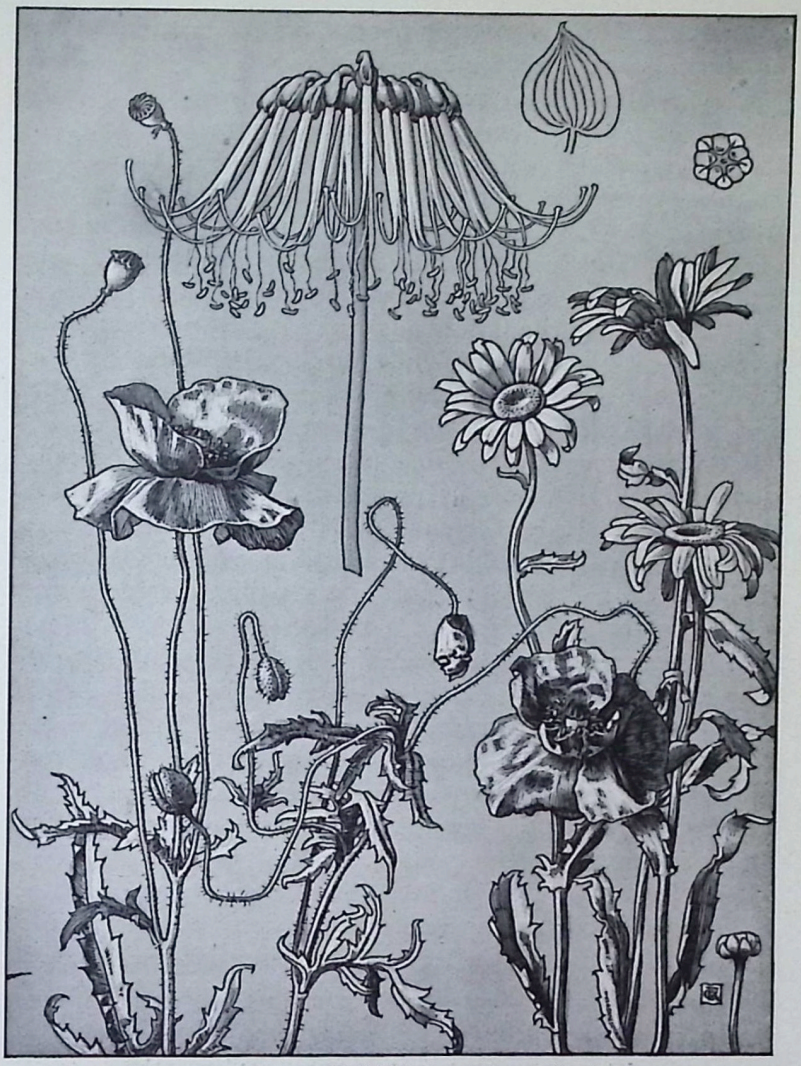


FIG. 25.—Poppy, Field Daisy, Lily of the Andes.

calyx becomes the involucre, which in the case of the Sunflower is composed of a series of imbricated bracts or incipient leaves, true leaves being also attached. This

is ornamental to a very high degree, and presents remarkable instances of composition of line.

The corolla is that part of the plant which is usually spoken of as the petals; it is the ornamental part of the flower, and primarily exists for beauty. It is not essential to the life of the plant, nor is it necessary for its fertilisation. Linnæus observed in 1753 that the flowers of several plants brought from Spain and grown at Upsala did not show any corolla and yet produced seeds; in fact, the only parts of the flower necessary for the production of fruit and seed are the stamens and carpels. The corolla, unlike the calyx, never remains to form part of the fruit, which is the ultimate end of all plant energy.

Flower forms may for decorative purposes be broadly divided into the following classes :—Star-formed or stellate flowers; bell-shaped; cup-shaped; spur-shaped; labiate or lipped; pea-formed; thistle-shaped; catkins; "fleurs-de-lys"; umbelliferous; and flowers which do not come within any of these classes.

Of these, stellate flowers are by far the most numerous. These may be subdivided into—1. Sun-shaped flowers, in which the florets and stamens form a disc with a series of radiating petals, as in the Sunflower, Daisy, Coltsfoot, Goatsbeard, Yarrow and many others. 2. True stellate flowers, in which the petals are more or less pointed, and form a star, as the Nightshade, Starry-headed Trefoil, Purple Saxifrage, London Pride, Stonecrop, Ragged Robin, St. John's Wort and others. 3. Flowers which form a trefoil, as the Snowdrop, Arrowhead, Frog-bit and others. 4. Quatre foils, or cruciform, as Lady's Smock, Wallflower, Germander, Speedwell, Herb Paris, &c. 5. Cinque foils, as Sun-dew, Cranesbill, Pimpernel, Wild Rose, Periwinkle, Forget-me-not, Primrose, and a large number of others. 6. Six foils, as Anemones, Flowering Rush, Narcissi and others.

Bell-shaped flowers are usually hanging or dependant, as

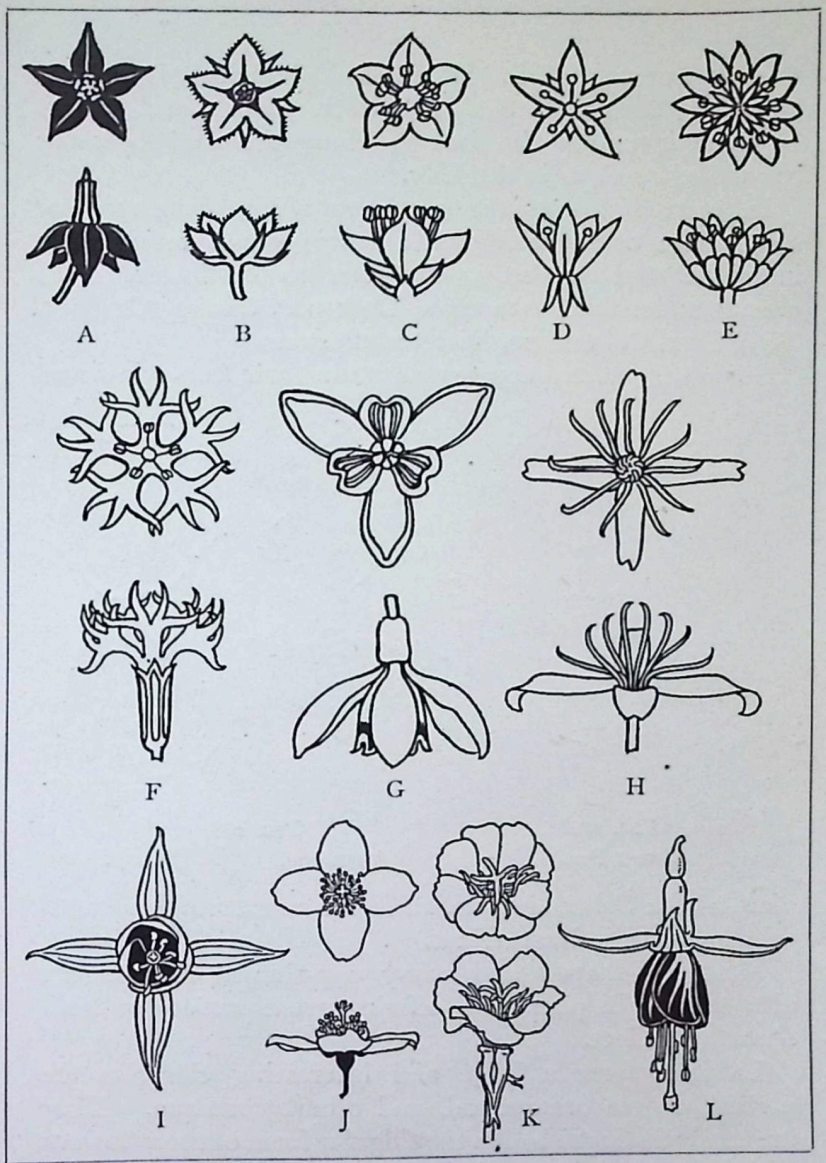


FIG. 26.—Various flower forms. A, Nightshade; B, Pimpernel; C, Saxifrage; D, London Pride; E, Houseleek; F, Ragged Robin; G, Snowdrop; H, Clematis; I and L, Fuchsia; J, Syringa; K, Evening Primrose.

the Canterbury Bell, Harebell, Bluebell, Hyacinth, Fritillary, Solomon's Seal, Lily of the Valley and others. In some instances the bell is elongated and becomes trumpet-shaped, as in the Lily.

In spurred flowers the petals terminate in a spine or spur, more or less elongated; this gives a remarkably individual and decorative character to the flower. This class includes the Nasturtium, Larkspur, Canary Creeper, Toad Flax, Columbine, Violet and others.

Some spurred flowers are stellate in their front view and

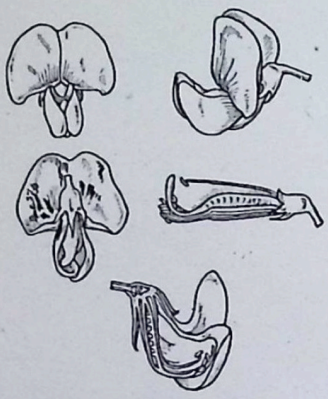


FIG. 27.
Sweet Pea.

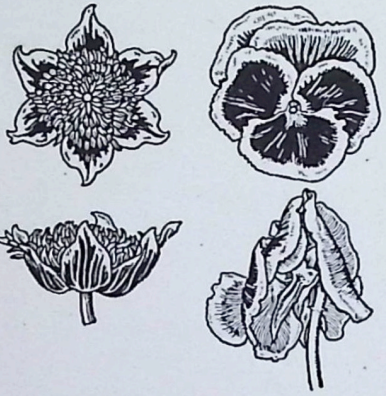


FIG. 28.
Anemone. Pansy.

plan, as the Columbine, which forms an extremely beautiful star, and the Nasturtium.

Most bell-shaped and many cup-shaped flowers are also stellate in plan, thus offering great variety in their decorative effect.

Labiates form a large and interesting class, in the highest degree ornamental, and often grotesque. They are easily distinguished in the singular form of their flowers, which consist of two distinct parts or lips, one of which generally falls down, while the other stands erect. They include the different aromatic plants, such as Thyme, Sage,

Mint and Balm. The class also includes the Bugles, Germander, the Dead Nettles, Ground Ivy, Snapdragon and others. Allied to the labiates are the different mouth-shaped Orchids. Some spurred flowers are also labiate, the Toad Flax is a well-known instance.

The Sweet Pea (Fig. 27) may be said to be representative of the Papilionaceous or Butterfly-shaped corolla. It consists of one large petal, which has been called the "standard" or "sail," which when fully opened is bent back over the calyx, and is folded over the rest of the corolla in wet or stormy weather; two "winged" petals, which are usually folded closely together, within which are two other petals forming the "keel," which in their turn enclose the reproductive organs. The two petals forming the keel are often joined together until pollination takes place, when they divide.

Thistle-shaped flowers must be placed in the class of the composites, such as the Daisy and Sunflower. Some botanists speak of Thistles as composites in an early and relatively simple stage of development; decoratively, however, they are a development of the composites.

The structure of the composites is as follows, taking the Field Daisy as a representative example:—The yellow portion or eye in the centre consists of a number of florets ranged in circles, each having a tubular corolla, divided into five lobes, with no calyx to speak of; five stamens united in a ring round the style, and a pistil with a style divided above into a two-fold stigma.

The outer florets, forming the white ray of the flower, are very different in character from the centre ones. They have a long strap-shaped corolla, which forms a tube at its base, a style and ovary, but no stamens. The whole is set upon a more or less flat plane surrounded by its green envelope of leaves, which is called the involucre, and which acts to the compound flower-head in the same way as the calyx acts to the single flower; it is a compound calyx, in fact.

With catkins we deal with an entirely different system or type of inflorescence. These consist of a number of individual florets depending from a central stalk, and are usually confined to the larger trees, such as the Poplar, Hazel, Birch and others. As a rule catkin-bearing trees flower before the leaves appear. The illustration of the catkin of the Birch (Fig. 29) will serve to give an idea of the general character of the form of inflorescence, which, although not very decorative, yet may occasionally be treated with excellent effect ornamentally. Fleurs-de-lys, which include the different Irises, are a comparatively small class numerically, but so extremely individual, so highly ornamental, that they are placed here as a class by themselves. Botanically they are placed in the same order as the Crocus and Gladiola, with which they have nothing decoratively in common (Fig. 30).

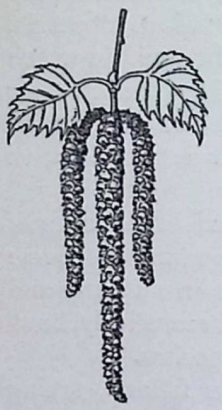


FIG. 29.—Catkin of Birch.

In umbellifers, the apex of the main stem gives off a number of radiating branches and stalks, each bearing a flower, the bracts beneath the flower-stalks forming an involucre. This represents the simple umbel, such a plant being the common flowering rush. There are, however, compound umbels, in which the inflorescence consists of a number of single umbels each provided with an involucre, and the whole inflorescence with a common involucre. This forms a very large class, and includes the Carrot, Parsley, Hog's Fennel, Samphire, Coriander, Hemlock, Chevril and many others.

The stems and stalks of these plants are generally hollowed and furrowed, the leaves generally compound and greatly serrated. The flowers of this order have usually five petals and five stamens. The small size of

FIG. 30.—Spanish Iris.

the flowers make them difficult of treatment in ornament. The seeds, however, of such a plant as the Giant Hemlock are extremely ornamental, and the bursting of the bud of this plant—indeed, most of the umbelliferæ—provides one of the finest ornamental *motifs* in the whole of plant growth.

Then there are the spires, forming a very large class. These are plants in which the inflorescence is ranged round, or depended from a central or main stalk. This class includes the Foxglove, in which the bells hang in front of the stalk, from its habit of growth in ditch banks or under hedges, where the light only falls in front of the plant; the Toad Flax, which is a true spire and extremely beautiful; the Lupin, the Monkshood, the Larkspur, the Hollyhock and many others.

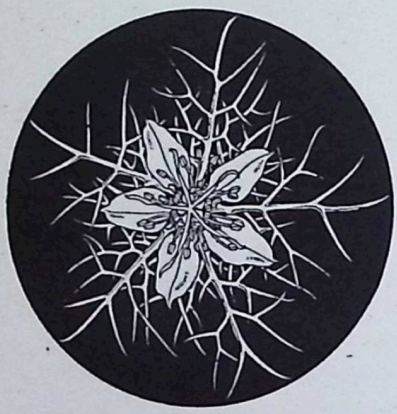


FIG. 31.—Love in a Mist.

It must not be inferred that the foregoing classes cover the whole ground of floral form; they only represent the leading types: the variety is infinite.

The flower, therefore, must be regarded as representing an aggregate of various parts or forms, which individually are in many instances not so ornamental as the leaves. This, doubtless, is the reason why many rosettes in Classic and Renaissance ornament are made up of leaf form rather than petals. Considered as a whole, however, the flower must be regarded as the most ornamental portion of the plant, and, most important to the decorator, it provides the colour note.

Welsh Onion.

White Bryony.

FIG. 32.

THE FRUIT AND SEED.

Properly speaking, the fruit and the seed are one—that is, the fruit *contains* the seed, although it does not always *enclose* it. In botany, the term *fruit* is a restricted one, and is divided into *true* fruit and *spurious* fruit. True fruit is that in which nothing outside of the pistil has entered into its formation. Spurious fruit is that produced by the aid of any other organ than the ovary.

It is somewhat curious that almost all those fruits popularly known as fruits, and sold by the fruiterer as edibles, are, botanically, spurious fruits. The Apple, the Pear, the Pomegranate, the Strawberry, the Pineapple belong to this class. In the case of the Apple, the succulent portion encloses the real fruit, and is so closely united with its growth as to appear a part of it. In the Strawberry the soft portion which is eaten is the swollen receptacle, and the true fruit is the straws or seeds which appear on its surface. In the Pineapple the ovaries and bracts of the inflorescence form a united mass around the axis and represents the spurious fruit.

For the purposes of the present work, however, apples, pears and pomegranates are *fruit.*

Fruits present as much variety in their character and formation as any other portion of the plant. They may be either simple or compound, dry or succulent, dehiscent—*i.e.*, their opening out, usually late in the summer or in autumn—or indehiscent, in which latter case the seed is retained in the seed-vessel until germination.

Dry, dehiscent fruits are divided into the following main types :—

1. Legumes or pods, as Pea, Bean, Laburnum, Gorse, Clover, Vetch, Broom, &c. These are both dry and dehiscent, opening out along the mid-rib and margin (Fig. 33) (1).

2. Follicles, which are similar to pods, but dehisce along

the margin alone, as Christmas Rose, Marsh Marigold, Columbine.

3. Siliquæ, which dehisce from the base upward, dividing themselves into two valves, as Wallflower, Shepherd's Purse (Fig. 33) (2), and most of the cross-bearing flowers.

4. Capsules, which consist of two or more carpels, and are classified according to their mode of dehiscence—*i.e.*, along the margin, as Figwort; along the mid-rib, as Iris (Fig. 33) (6), and Pansy; by teeth, as Chickweeds; by pores beneath the stigma, as Poppy. Although the several types are distinct and individual, it is possible to trace a continuous development, and to establish a relationship between the bi-valve of the Laburnum and the tri-formed capsule of the Iris or Pansy.

When ripe the two valves of the seed-pod of the Laburnum burst open, and the dark seeds are exposed; these are ranged at regular intervals alternately along either valve. Nothing could possibly be more ornamental. The capsule of the Dog-tooth Violet is tri-form, each of the three valves containing three, four or five pear-shaped seeds. The walls of each valve become dry and hard as the seed ripens, press together against the seeds, and finally eject them. The form and smooth surface of the seeds facilitate their ejectment, and in some instances a seed will be thrown to the distance of ten feet or more.

The seed of the Iris may be said to be a development (ornamentally) of Viola Canina. It is also tri-form, but with two rows of seeds instead of a single row in either valve (Fig. 33) (4), (5), (6).

Indehiscent fruits may be either dry or succulent, the two chief types of dry fruits being the nut and achenes or small carpel, both being one-seeded. Succulent fruits may be divided into two classes: in the one the true fruit or seed (kernel) is protected by a hard wall or covering (stone fruit); in the other the outer

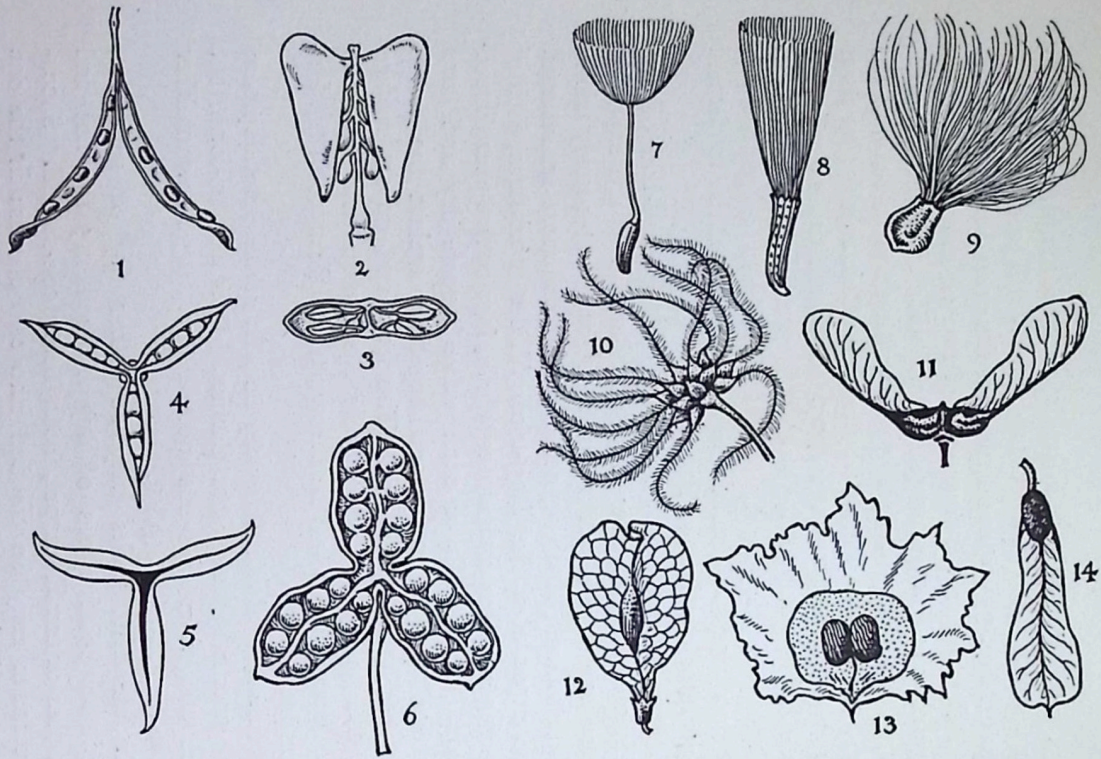


FIG. 33.—Fruits and Seeds. 1, Laburnum ; 2, 3, Siliqua of Shepherd's Purse ; 4, 5, Violet before and after ejection of seed ; 6, Iris ; 7, Dandelion ; 8, Hawkweed ; 9, Milkweed ; 10, Achenes of Clematis ; 11, Sycamore ; 12, Elm ; 13, Bigonia Alba ; 14, Ash.

covering is softer and the seed walls softer also, as Gooseberry.

Apples and Pears may be said to bridge over to some extent the gap between these two classes, the seeds being contained in five chambers (achenes), Fig. 34, these constituting a wall or covering, though not so hard as stone fruits (drupes).

As there are compound flowers, so there are compound fruits. These may consist of (1) a number of follicles, as Columbine, Aconite; (2) a number of achenes, as Buttercup, Rose; (3) a number of drupes, as Blackberry, Raspberry.

It will be noticed that the form of an apple is not round like that of a ball or an orange; but that the pentagonal shape which is assumed by the blossom is *continued in the fruit and in the disposition or arrangement of the seed* (Fig. 34). It is an instance of that general consistence of form which is more or less observed throughout Nature. The same pentagonal form is found in the transverse section of a pear.

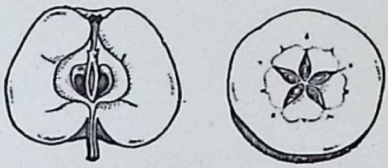


FIG. 34.—Section of Apple.

There is another class of seeds that develop a feathery tuft, which serves as a parachute. These are the wanderers, and are wafted by the wind often to a considerable distance before they find their resting place. Such seeds are those of the Thistle, the Clematis (Old man's beard), the Dandelion, the Goatsbeard (John go-to-bed-at-noon) and the seed of that remarkable American plant called the Milkweed (Fig. 33) (7—10). The capsules of the latter only open with the sun. Nothing could be more remarkable than the bursting of these pods, with their red-brown seeds, and snowy tufts which have the quality of the finest silk, the pod being of a low olive green. Nothing could be more surprising than the effect

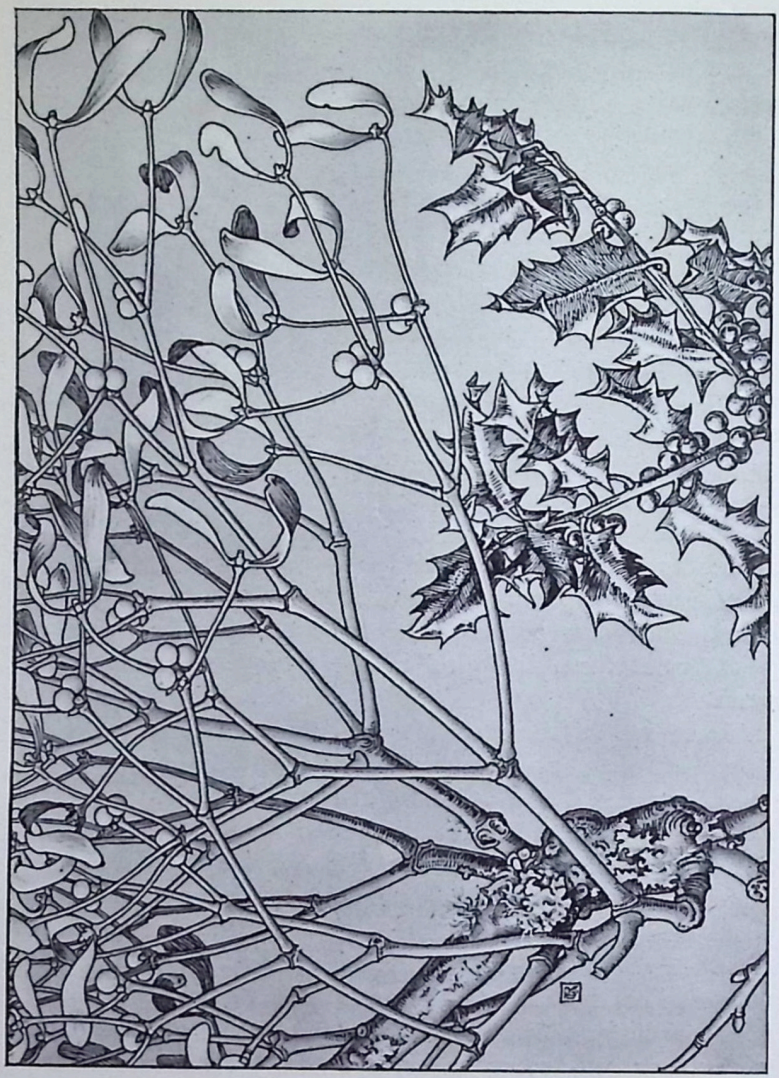


FIG. 35.—Holly and Mistletoe.

of the plant in its native wilds, with its curious shaped pods, which when bursting in a high wind give the effect of a snowstorm. The plant grows to a height of six feet or more.

The various means that Nature adopts for the dispersion of its fruits and seeds are as follows:—

By wind: the organ being (1) the feathery styles of fruit, as Clematis; (2) a pappus attachment to fruit, as Dandelion; (3) a winged attachment, as Sycamore, Ash (Fig. 33) (11—14); (4) a hairy attachment, as Cotton, Willow Herb.

By water: fruits provided with air spaces acting as floats, as Water Lilies.

By animals: succulent fruits, as Hips, Haws, Berries, Acorns, &c., eaten by birds, the seeds being cast out of the body often at a considerable distance from the parent tree or plant; also fruits having various appendages that become attached to the woolly coats of sheep or other animals, as Hound's Tongue, Cleavers, Herb Bennet. In the case of the Mistletoe, a parasitic plant, the sticky berries adhere to the beak and feet of the Missel Thrush, a bird that evinces a special affection for this food. The sticky matter is rubbed off on to the bark of an Apple or Poplar tree, the bird thus acting as a direct agent of propagation.

By explosive action: as Violet, Vetch. In some instances, as that of the Sand-box tree of the West Indies, the large round capsule bursts with a sound like the report of a pistol, and with such force as to inflict a severe wound on anyone who happens to be struck.

The seed-head of the common Poppy is provided with a series of small apertures for the dispersion of the seeds when the plant is swayed by the wind. These apertures have little doors or lappets underneath, which are said to close up during wet weather, and are further protected from the rain by overhanging leaves. The interior of this

charming piece of Nature's architecture is divided into eight chambers, each having its little aperture at the top. It may be said to be one of the masterpieces of the Great Designer, and illustrates in itself nearly all the laws of ornament which exist.

It will be seen, therefore, that in the form of seeds, as in floral and leaf form, the same decorative principle of development is observed, the same reasonableness and order throughout, the same sense of continuity. May we not as designers learn our lesson from the Great Master-hand, who leaves nothing undone, leaves no staring gaps, forgets nothing, whose variety is infinite, and whose decorative *motifs* range over the whole gamut of the possible?

FIG. 36.—Bay.

CHAPTER II.

THE ORNAMENTAL FILLING OF GIVEN SPACES.

We may now be said to have fairly though briefly considered the various ornamental laws or principles which Nature has laid down for us, and a portion, at any rate, of the infinite variety of forms that plant growth assumes. The leading principles are precisely the same in the animal as in the vegetable kingdom; indeed, this ornamental or decorative principle is universal in the works of Nature.

Having, therefore, supplied ourselves with a number of carefully selected studies from Nature, it now becomes necessary to apply their ornamental suggestion to a definite decorative purpose. To do this one must simplify, one must generalise, one must emphasise, one must reject; in the place of light and shadow, for surface ornament, one must substitute firm boundary lines and more or less flat tones. In the case of relief a similar process of simplification and emphasis takes place. But since the student must learn to walk before he is able to run, the Educational Authorities have very properly divided the examinations in ornamental design into two stages, the first consisting of more or less simple exercises in the ornamental filling of given spaces including repeating patterns, without any consideration as to their application in any given material.

One of the simplest means of obtaining ornament is by the device of doubling over a form. If one takes almost any unsymmetrical form and doubles it over, one at once produces symmetry and some sense of order—the result at

once becoming ornamental. The experiment of writing one's name in ink and doubling it over will be familiar to everyone. The illustration of the natural sprig of Friesia (Fig. 37), the first to hand, is a case in point. Once having obtained a suggestion by this means, the design may be amplified or otherwise completed. A few experiments with the different natural forms given in this work, or, better still, with studies made direct from Nature, will give very satisfactory results. This law of symmetry is the *motif* of most of the space-filling exercises called for in the examination in Design, Stage 1.

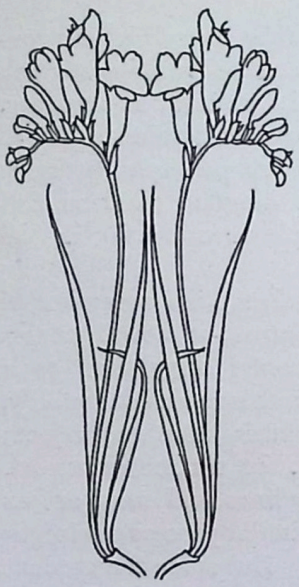


FIG. 37.—The Ornamental Value of Doubling.

The above, however, is the most primitive and most obvious method; it is practically allowing Nature to do our designing for us. In order to pass the examination in elementary design something more will be expected of the student; in fact, this examination is intended as a practical test of his skill in the ornamental filling of given spaces.

The decorative value of a design depends, firstly, upon its linear planning or line arrangement—*i.e.*, a harmonious blending of the leading lines; secondly, upon the distribution of its masses built upon the leading lines; thirdly, upon its colour scheme, if any; fourthly, upon its expressive drawing and general technical accomplishment.

A number of such linear plannings are therefore illustrated for various shapes given in the examinations, such as the square, oblong, lozenge, triangle, circle, semicircle, spandril, &c. (Fig. 38). Such plannings are, however,

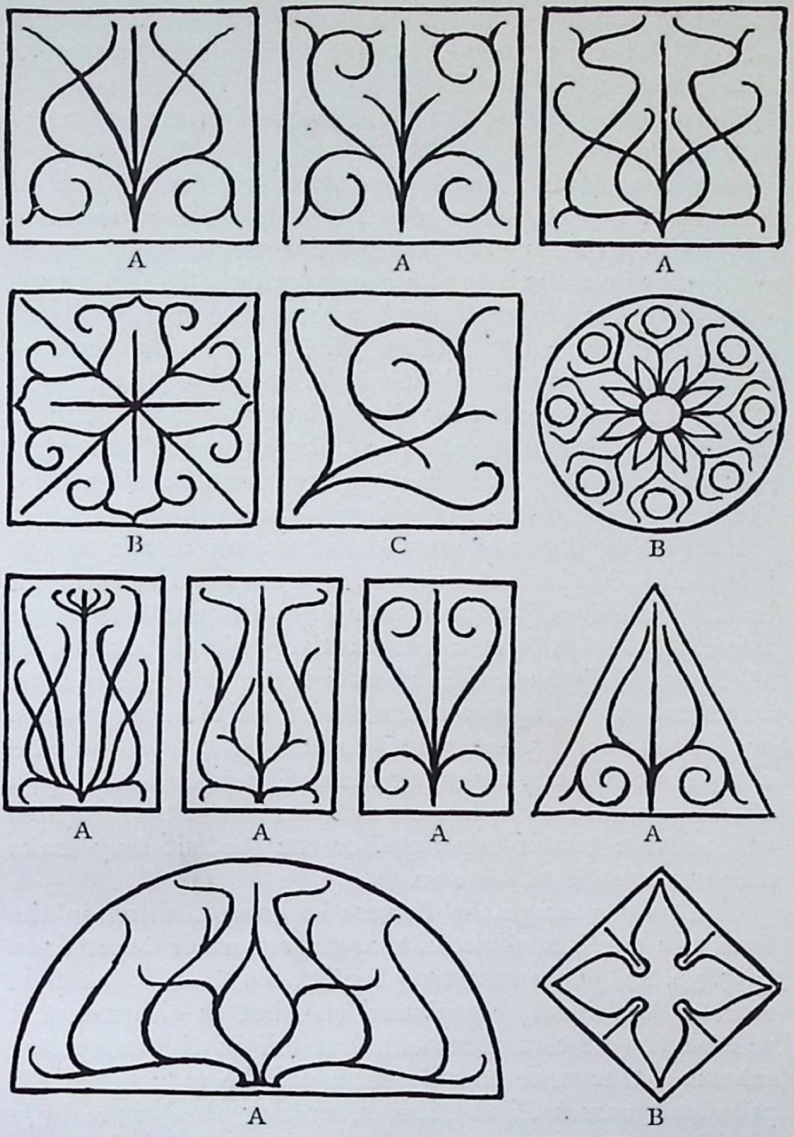


FIG. 38.—Linear Plannings. A, Radiation from base; B, Radiation from centre; C, Radiation from one corner.

subject to some modification in the working out, although it might be a very good practice to rigidly adhere to a fixed planning.

Radiation is one of the chief laws of ornament as of natural growth.

In setting out a panel, therefore, on the system of symmetry, say a square to take the simplest form, one may do three things—radiate from the centre, from the four corners, or from the base at a central point. In setting out a design on the unsymmetrical system one can only radiate from one of the corners (Fig. 38, C). The character of the leading lines should obviously be suitable to the growth of the plant selected they should have proper relation to the shape to be ornamented, and also to each other.

Having arrived at a satisfactory system of leading lines, the next consideration is the disposition of the masses.

Everything depends upon the character of the design intended. If it be in self colour, or if the foliation be small in scale, one usually conceives in lines, the dressing up on a line foundation being a comparatively simple matter, its effect chiefly depending on observing the principle of even distribution. If, however, the design be in large masses, or if it be in colour, one conceives in masses. In the case of a colour scheme, assuming the design to be based upon a flowering plant, the flowers or fruit, as the case may be, will provide the colour note, or the student may make a colour scheme of his own.

One may arrange the flowers in groups, either in the form of a circle, semicircle, triangle, square or other form (Fig. 39, A). One may spot the flowers all over the field more or less evenly distributed (B), but in either case it will be the flowers that will first tell in the completed scheme. Our next consideration will be to arrange the principal masses of the leaves, uniting the whole by a good homogeneous system of stem growth of a character consistent with that of the plant employed.

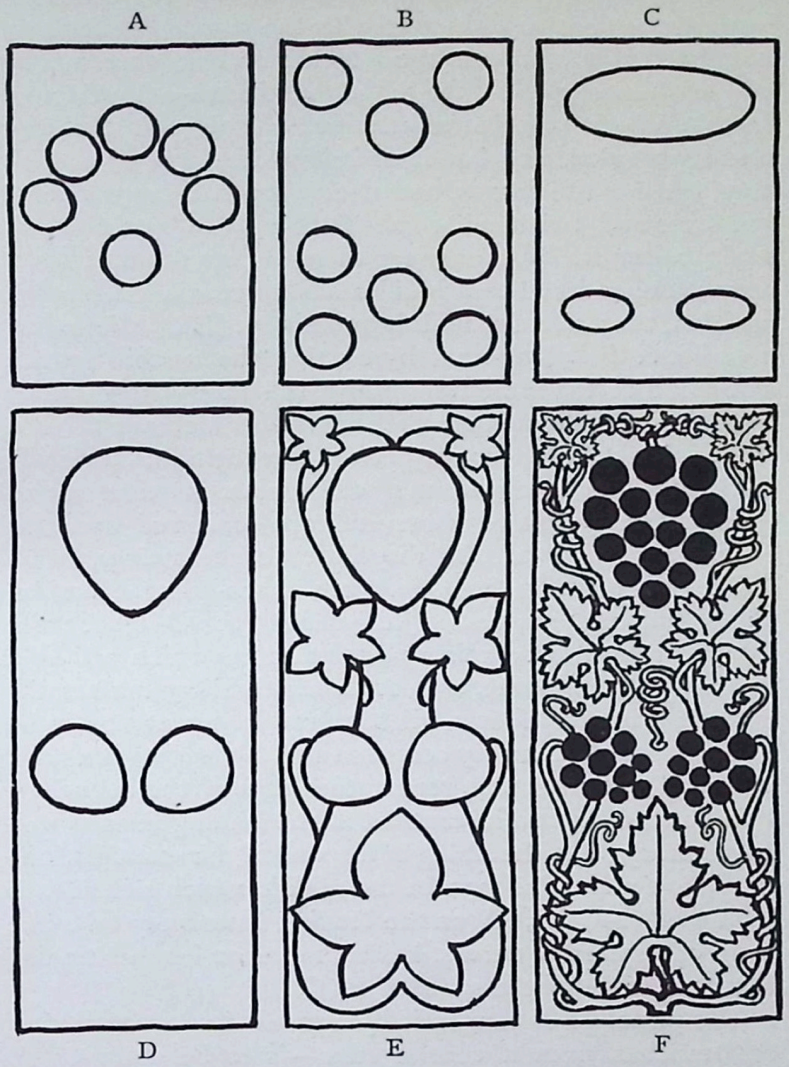


FIG. 39.—A, B, C, Colour Spacing; D, E, F, Three Stages of Space-filling.

Let us by way of further illustration take an oblong upright panel to be decorated with the vine. We first set out the general shape of the bunches of fruit, or even, by way of inducing ideas, the individual fruits—one principal bunch, which in this instance we will place at the top, and two subsidiary bunches below (Fig. 39, D). We then set out the leaves, and decide upon a large one at the base and two smaller ones flanking the fruit immediately below it. We connect them by a system of stalk formation, and find that besides having considerable space unfilled, the stalks are unduly prominent (E). We therefore break their long lines by twining the tendrils around them and at the same time filling the intervening spaces with ornament of a somewhat lighter character (F). The above, doubtless, is not a perfect composition, but it will serve to illustrate the method, which is that of all symmetrical panels of whatever shape conceived upon the principle of growth. The disposition of the masses, either of colour or form, will, in mere space-filling exercises, depend upon the taste and judgment of the designer ; the general rule, however, is a principal mass which will hold the attention, and one, two, or three subsidiary masses, the general principle of even distribution being at the same time observed. In many compositions the leading lines and masses, to some extent, repeat the form of the boundary, though there should be contrast in the leading lines as well as harmony. In the filling of a spandril, for example, one may have a circular form in the middle, which will always look well (Fig. 40, A), or the leading lines may take the form of a series of curves, having more or less relation to the two arches of the spandril B, C.

The principle of tangential junction—*i.e.*, of throwing off branches from a central stem—is to be observed in all ornament. Finally, the law of continuity, both of line and idea, should be adhered to as far as possible, the best designs forming one homogeneous whole, complete in

themselves, all the different parts having proper relation to each other.

For unsymmetrical panels a somewhat freer treatment seems to be called for than in the cases of those in which symmetry is observed. For panels which have a surrounding border also, a freer treatment is generally allowable in the panel than in the border. The border, however, serves as a framework to the filling, and must therefore contrast with it. If the filling is free and elaborate the border must be simple and severe; if, on

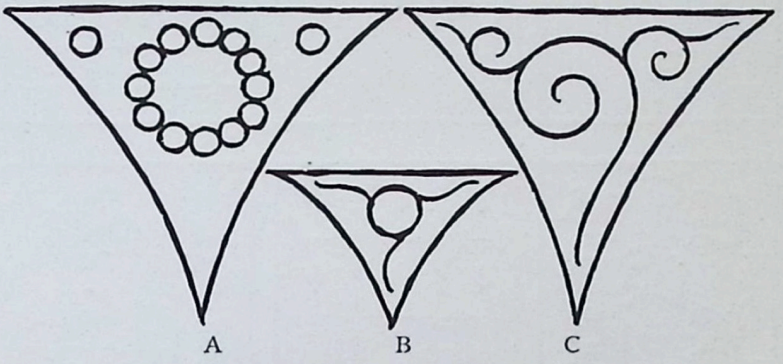


FIG. 40.—Setting out of Spandrils.

the other hand, the filling is simple, a greater degree of elaboration is usually demanded in the border, a similar scheme of decoration being adopted in both, but treated in a different manner.

The treatment of the background is an important matter, and is capable of much variation. It may be darker or lighter than the ornament. It may be treated as a diaper of lines, spots, circles, or various powdered patterns. A design may be superimposed on another of a subordinate character and smaller in scale. This latter, however, is more suitable for "all-over" patterns, and was largely employed by the late William Morris in his textiles, wall-papers, &c. Its uses will be sufficiently

obvious: it affords an opportunity for the introduction of a fresh colour *motif*, and it imparts variety to the design.

In the examination for elementary design, Stage 1, students are also called upon to make designs that may consist of arrangements of straight lines, geometrical and interlacing ornament, scroll work and foliated ornament, and simple

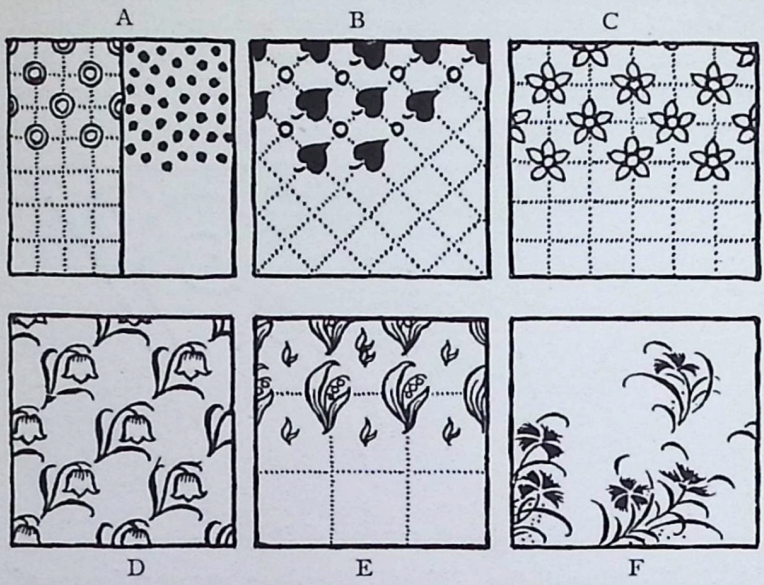


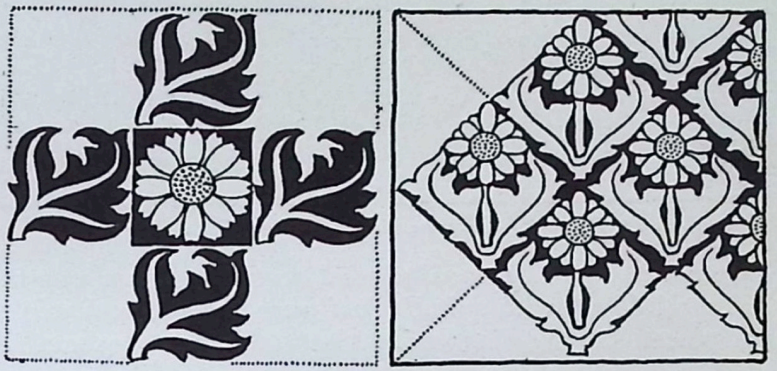
FIG. 41.—Powdering, Spotting and Sprigs.

A, Simple Spotting, regular and irregular; B, Leaf Spotting on the diamond; C, Flower Spotting on the square; D, Sprig Diaper on the diagonal; E, Sprig Diaper on the square; F, Irregular Sprigs (Japanese).

repeating patterns. These latter are of three kinds—the "powdered" or "spot" diaper, which may or may not take a geometrical shape (Fig. 41, A, B, C), the diaper in which the design is enclosed within boundary lines taking the form of the square, triangle, lozenge, hexagon, &c. (Fig. 42, A, B), designs in which the leading lines take the forms above indicated, but are united so as to form one more or less continuous pattern (Fig. 44, A). The meaning of the

term "spot" or "powdered" pattern will be sufficiently obvious. Its most elemental form is the simple spot or small circle, placed at regular or irregular intervals over the field (Fig. 41, A). It may assume any geometrical shape, or it may take the form of a flower, leaf, or combination of both (Fig. 41, B, C, D).

From the spot to the sprig is an easy step. Sprigs may be arranged on the lines of the square, lozenge, triangle, or other shapes (Fig. 41, D, E), or may be placed irregu-



A B

FIG. 42.—Field Daisy. A, Simple alternative on the square; B, Diaper on the lozenge.

larly, as in many Japanese patterns (Fig. 41, F). They may consist of a single, well-arranged sprig; of an alternation of larger or smaller sprigs; or they may be so designed as to take the direction of a flowing stem, and so without being connected suggest a continuous pattern (Fig. 41, D).

Let us suppose, by way of further experiment, that a couple of simple repeating patterns are asked for, using the Field Daisy as a *motif*.

A very good pattern may be obtained by arranging the plan of the flower and leaf on alternate squares. In the example given (Fig. 42, A), the flower is symmetrical and the leaf unsymmetrical, but the leaf may be placed

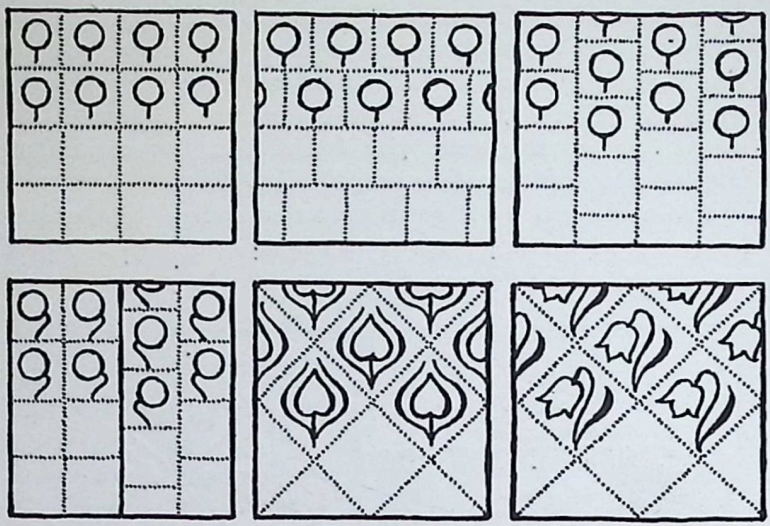
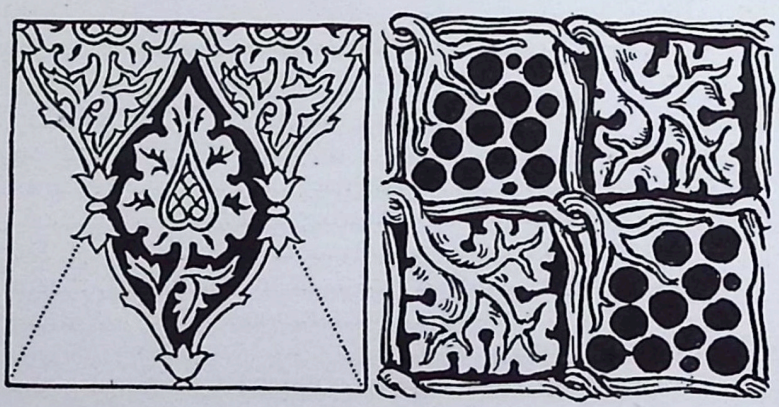


FIG. 43.—Various methods of setting out.

symmetrically with equally good results. If an unsymmetrical flower with suitable leaf were chosen, both might be placed on the diagonal. Alternation and contrast is



A B

FIG. 44.—The boundary lines of plan unit forming a feature of the design.

further emphasised by making the flower light on a dark ground and the leaf dark on a light ground, thus suggesting the contrast in the colour of the natural plant. If the squares be placed diamond-wise, a very good design may be made by using a single flower with two leaves placed symmetrically on the stem (Fig. 42, B). This sort of setting out is capable of many variations—several are given in illustration of the principle (Fig. 43).

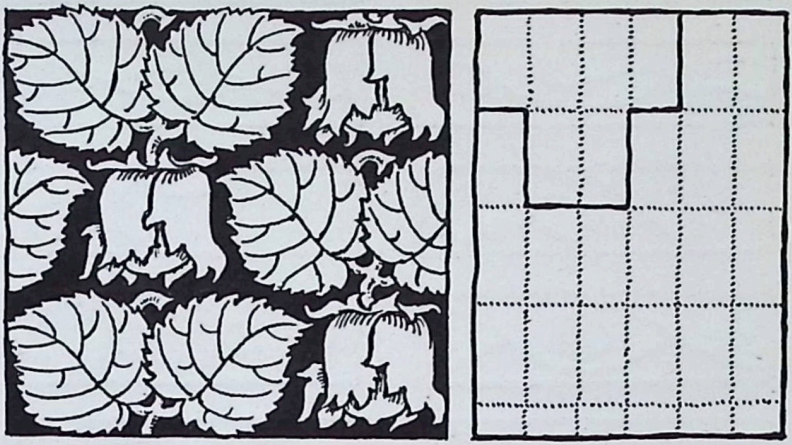


FIG. 45.—Simple diaper: Hazel Nut, with Planning.

The boundary lines of the plan unit may be made a feature of the ornament itself, as in the cases of many fifteenth-century damask patterns—two examples are given, on the lozenge and square (Fig. 44, A, B).

The next step consists in designing those "all-over" patterns in which the leading lines and masses of the repeat travel over the boundary lines, the design being more or less continuous, and these will provide the true test of the student's powers of invention. This, however, is considered in the chapter following.

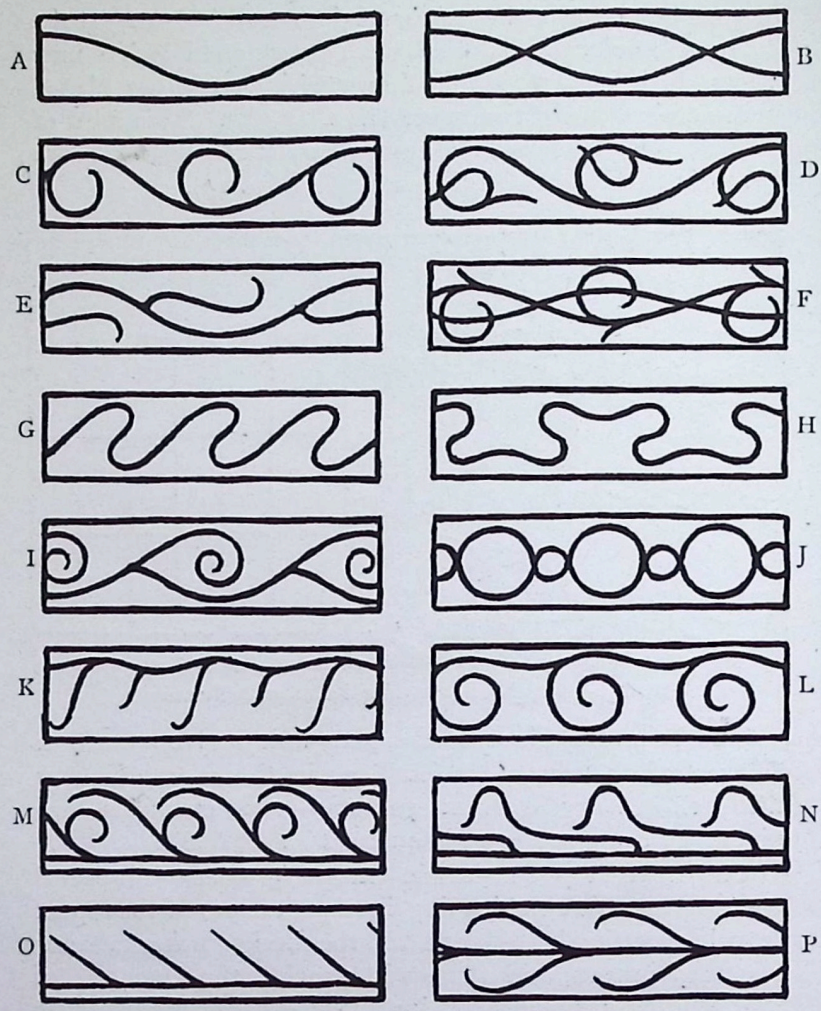


FIG. 46.—Linear Plannings of Borders.

BORDERS.

Borders form an important feature of ornamental design, and always demand careful consideration. The method of procedure is precisely the same as for panels—*i.e.*, they are built up on a system of leading lines and a disposition of masses.

The simplest and generally most useful form of setting out is the meander or wave, forming a continuous stem from which leaves, flowers or buds may be thrown off at intervals (Fig. 46, A). This may be doubled, forming a loop (B). Curves taking various shapes may be thrown off at intervals from either of them (C, D, E, F). A meander may undulate in various ways (G, H), or it may be doubled so as to form a guilloche (I, J). The main stem may be placed at the top or bottom of the border, throwing off branches in various ways (K, L, M, N, O), or it may form a straight line occupying the centre (P). It will be obvious, however, that the most suitable plants for border patterns on a continuous stem are those of running or climbing growth, as the Ivy, Bindweed, Bryony, Nightshade, Canary Creeper, Vine, Cucumber, Gourd, &c.

Simple repetition is arrived at in border form by placing the flowers at regular intervals, the spaces being filled with a meandering stem dressed with leaves. A plant with running growth should properly be chosen for this purpose.

Let us take the Convolvulus or Bindweed as suitable. By a simple alternation of leaf and flower on a meandering stem we arrive at quite a satisfactory edging (Fig. 47, A). By doubling this over we produce an excellent and effective border of quite sufficient complexity for most purposes (B), or a very satisfactory border may be produced by adhering more closely to the natural growth of the plant—*i.e.*, the leaf and flower springing from the same point on the stem (C).

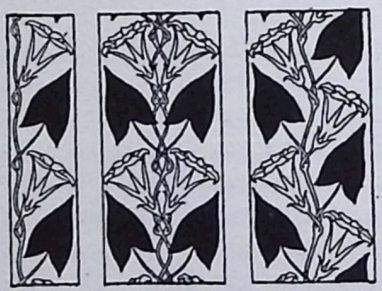
The natural growth of the plant will often suggest a design,

a notable instance being the Lime branch illustrated, in which Nature practically does the designing for us (Fig. 48, A).

Convolvulus. Study from Nature.

Here we have a continuous border pattern ready made, which would be difficult to improve upon. The suggestion thus offered by Nature might very well be applied to other plants of similar growth.

An example is to be found in the Hazel Nut, which, with very little alteration or change, becomes a continuous border suitable either for the horizontal or perpendicular: this on a slightly meandering stem with double alternations of leaves and fruit, the field being completely filled (B). A particular feature of the plant may be treated by itself, as in the example given as tail-piece (Fig. 49), in which the tendrils of the Vine are made to form an interlacing pattern on a meandering stem.



A B C

FIG. 47.—Application to Border Patterns.

In designing a rectangular border, the arrangement of the angle or elbow will present the chief difficulty, and will demand the first consideration.

With a simple meander in which the chief element is

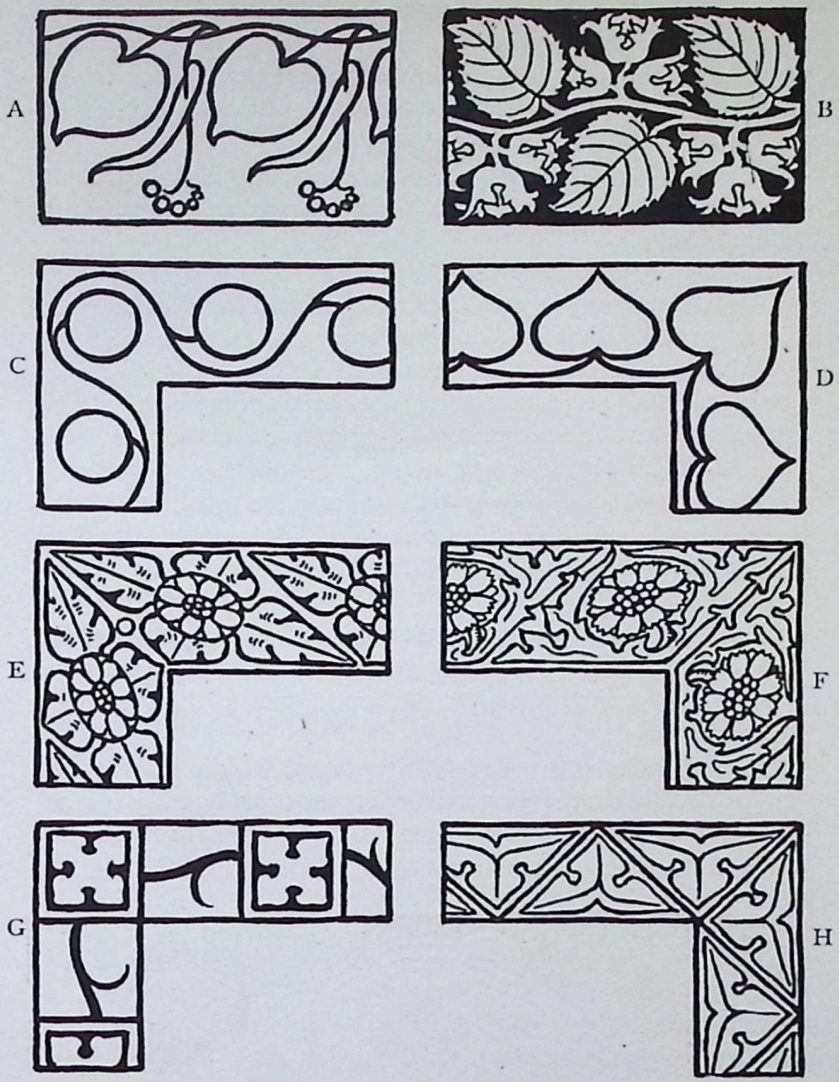


FIG. 48.—A, Lime, natural growth; B, Hazel Nut, simple alternation on a meander; C, D, E, F, G, H, Treatment of angle or elbow.

symmetrical the matter is comparatively simple, the principal element being placed in the centre of the mitre, and thereby fulfilling one of the chief conditions of the treatment of the elbow—viz., that the mitre line should be lost rather than emphasised (Fig. 48, C).

Similarly, if the chief elements are vertical, one of these may be placed diagonally at the elbow with but little alteration (D).

A border planned on a rhombus of 45° will repeat all right at the corners, but it simply shifts the difficulty to the centre, which would have to be specially designed (E, F).

A border based on the triangle will work admirably, provided the dimensions of the border are not a fixed quantity—*i.e.*, the length of either side of the border must be a multiple of the length of the triangle base (H).

The principle of superposition may be applied to the border, and by introducing squares at regular intervals along the border, the difficulty of the corner is obviated (G).

A border may be unsymmetrical and non-repeating, the natural growth being preserved and starting from a single point, the only principle observed being that of even distribution.

It may have several starting points, which may either be hidden behind foliage or what not, or frankly stated, even distribution again being the chief law observed (Fig. 66). Many examples are also to be found in old art.

FIG. 49.—Interlacing Border of Vine Tendrils.

CHAPTER III.

"ALL-OVER" PATTERNS, WALL-PAPERS, PRINTED FABRICS, TEXTILES.

In applied design we deal with a much more complex matter than anything afforded by mere space-filling exercises. It has become an established axiom of the æsthetics of applied arts that the designer should whenever practicable carry out his own design in the material it is intended for, and as a necessary corollary that the craftsman should be his own designer. This is a revival of the system that obtained during all past periods, but especially that of the Renaissance—when a man was master of not only one, but frequently of many crafts—to the period of the general introduction of machinery, about the commencement of the nineteenth century, which brought about the subdivision of labour. Its modern revival is due largely to the teachings of the late William Morris ; and while its utility in the higher branches of design may be open to question—it would have been difficult to persuade Burne-Jones and Madox-Brown to carry out their stained-glass cartoons in the actual material, and even Morris did not in every instance put his principles into practice—there can be no possible question that a knowledge of the working of any particular craft is not only desirable but absolutely essential to intelligent design, and that since material and method impose limitations upon and determine the character of a design, a description, necessarily brief, is given of the processes of working in the various crafts treated in the following pages.

WALL-PAPERS.

Wall-papers are printed from engraved wood blocks in two different ways: 1. By hand, from a flat block, at once the best and most costly method. 2. By machinery from a roller; each colour introduced in the design requiring a separate printing, and as a matter of course a separate block engraved. It will be obvious, therefore, that the patterns easiest to engrave are those in which the effect depends upon flat masses of colour with no softened edges or gradation of tint; and although in some machine-printed papers gradation is arrived at by means of

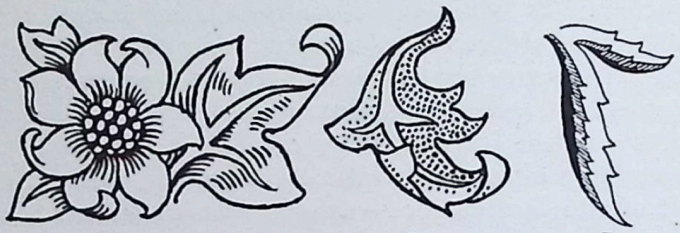


FIG. 50.—Methods of Shading.

engraving in stipple of varying intensity, the introduction of shade effects usually necessitates either the use of a series of lines, or dots, or both, as in many papers designed by the late William Morris, or of blocking out the shadows in decided shapes of flat colour as given in the accompanying illustration (Fig. 50, C).

The colours employed by the designer are body colours —*i.e.*, the pigment rendered opaque by the addition of white, more or less, according to the tint required; they are mixed or ground on a slab with a little gum arabic to enable them to flow freely and to adhere to the paper. A few trials will suffice to determine the amount of gum; it should be just sufficient to prevent the colours rubbing off with the finger when dry. If too much gum be used, the

colours darken and have an unpleasant shiny effect. Some artists' colourmen, however, supply body colours in tubes ready for use.

The reasons for the employment of the body-colour method will be obvious—we are dealing with a system of flat opaque tints capable of reproduction by means of flat tones printed from a wood block: tones produced by washes of transparent colour are therefore undesirable because more uncertain than body colour, which presents a perfectly uniform surface value.

As regards the number of colours used, as many as twenty or more are sometimes introduced for machine-printed papers, but it will be readily perceived that for hand printing this would be impracticable on the score of expense. Many excellent papers are printed in one colour only—*i.e.*, one colour on a ground of a lighter or darker tone of the same colour, or on a ground colour which contrasts pleasantly to the colour of the pattern. Further, colour value may be *suggested* by the treatment of the masses of the design—by the introduction, for example, of large masses of flat tone contrasted with closer work in the same colour, the effect of such closer work being capable of much variation. Designers will bear in mind that the introduction of every additional colour entails the expense of cutting a block as well as extra expense in printing; the most satisfactory designs, therefore, from a commercial point of view are those that give the maximum of effect with the greatest economy of means.

English wall-papers are of a uniform size of 21 inches wide, printed on paper 22 inches in width and in 12-yard lengths, the extra inch allowing a margin of half an inch on either side for the block "register" and also as protection to the roll, one side being trimmed off by the paperhanger and the paper overlapping the length already hung. A few special patterns are, however, produced of the width of 30 inches.

FIG. 51.

Woollen Damask Hanging, by J. H. Dearle.
Wall-Paper, by J. H. Dearle.
(By the Courtesy of Messrs. Morris & Co.)

The design is, therefore, made to the scale of 21 inches in width: the depth may vary according to the character of the design, but the limit is reached when the block becomes too large for the printer to handle easily—*i.e.*, 30 inches at the outside. The most usual scale is 21 inches × 21 inches for machine, but 21 inches × 17 inches and 21 inches × 15 inches are also used for block printing.

It will scarcely be necessary to point out that a wall-paper pattern is one which is necessarily made up of repeats, which may be any division of 21 inches, as $5\frac{1}{4}$, 7, $10\frac{1}{2}$ inches and so on. In height, 24, 27, and 30 inches are sometimes used. A design which may look very well in the unit—*i.e.*, the prescribed space of 21 inches × 21 inches—may become not only wearisome, but positively annoying when repeated over the whole wall space. It follows, therefore, that while the designer should have a clear idea of the general character of the design at the outset, he must proceed upon a regular methodical principle of setting out, firstly the exact limits of the design to measurement, secondly its geometrical basis, as square, oblong, triangle, lozenge or other form, thirdly the planning of the leading lines of the repeat, then the leading masses of the foliage, or what not, afterwards gradually elaborating the detail as the design grows; in other words, it is no use starting by making an elaborate drawing in detail of a plant or other form, and then afterwards endeavouring to piece it together into a homogeneous design. It is a good plan, however, to first make a small sketch to scale, say of one-fourth. Further, there are two different ways of treating a repeat—it may either be emphasised and in fact made a feature of, or it may be disguised.

By way of demonstrating the *rationale* of the repeating pattern as applied to wall surfaces we will take its simplest form, the division into squares; all repeating pattern, naturalistic or otherwise, being planned upon a geometrical basis. The space limit, 21 inches, or its equivalent to scale, is first

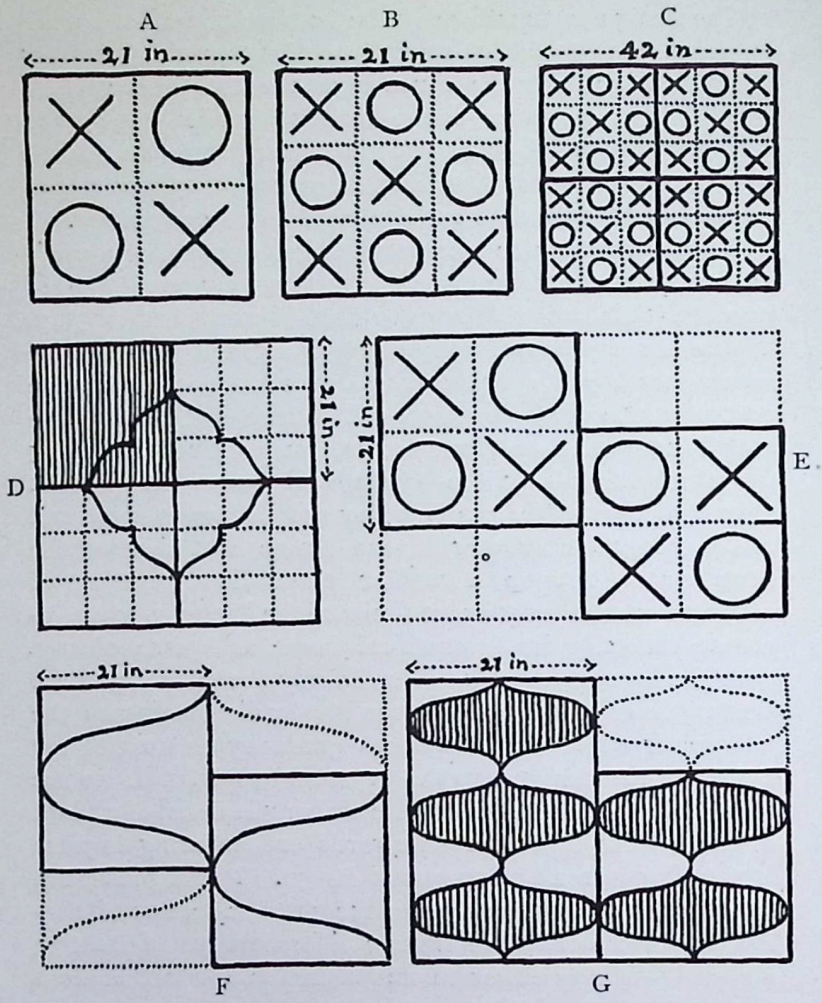


FIG. 52.—A, B, C, D, The Planning of Simple Repeats; E, F, G, the "Drop" Repeat.

set out. A division of the space into four squares, filled with alternating pattern units represented by the figures X and O, when repeated will give a series of diagonal

lines running in opposite directions over the wall space (Fig. 52, A, B). By increasing the number of squares to nine (B), using the same pattern units, we have, not the simple alternating repeat of (A), but the repeat in which the O's appear in a series of hexagons (Fig. 52, C). This affords an example of a device for increasing the scale of a pattern by allowing it to run over a larger surface of wall space; for example, the leading lines represented by the O's may be changed to the form illustrated in D, giving a pattern of 42 inches in the repeat. To return to our first diagram.

By the device of dropping or stepping the design in hanging, the simple alternated pattern is preserved (Fig. 52, E).

This represents the simplest form of what is known as the "drop" repeat, a most useful device in the planning of "all-over" patterns, by means of which a different scale of work is rendered possible, and also the repeat is disguised. The planning (F) will serve as an example of increased scale, the degree of drop being the same—*i.e.*, one-half, thus giving a pattern of 42 inches in width.

A pattern, however, based on similar lines may repeat within the width of the piece and still drop (G).

A pattern may also drop one-third of its depth (Fig. 53, A). On precisely the same principle it may drop one-fourth, one-fifth, or one-sixth, in each case the pattern recovers itself at the second, third, fourth, fifth, sixth, and seventh step as the case may be (Fig. 53, B).

The next illustration is planned for squares of 14 inches with halves of 7 inches; it is therefore necessary for the block to be 21 inches × 28 inches, also a third element is necessary in order to repeat (C).

The division may be alternated so as to form a brick pattern and still drop (D).

Patterns are also designed which repeat on both level lines and as a drop. Mr. L. F. Day ("Pattern Design")

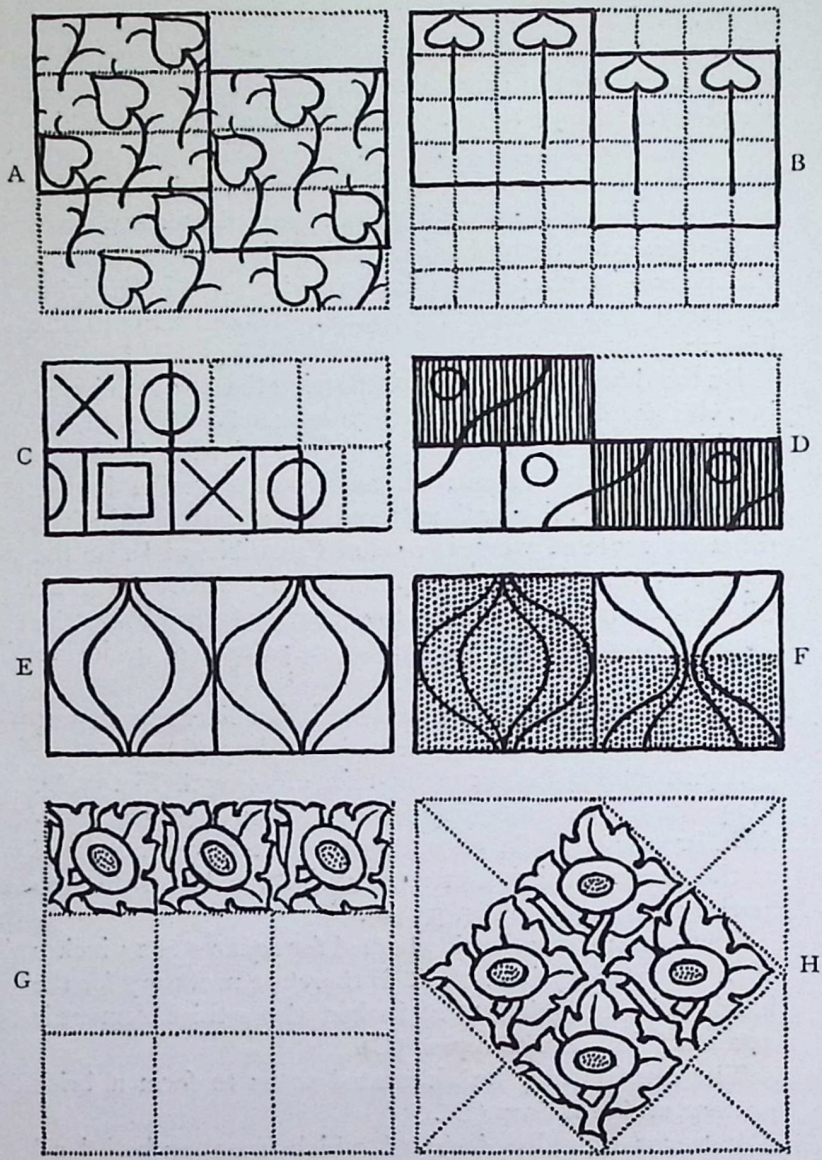


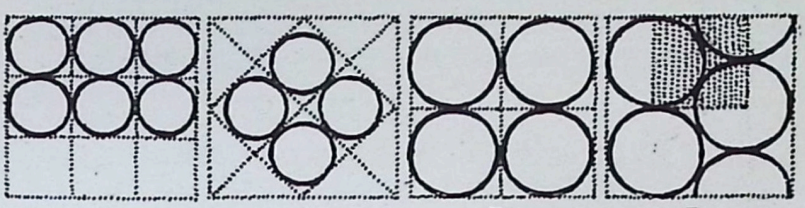
FIG. 53.—Variations of the "Drop" Repeat.

gives two diagrams by Professor Beresford Pite in illustration of this (E, F).

Simple square repeats may be turned round diamond-wise to work as a drop (G, H).

The same device may be adopted when the design is planned on the circle (Fig. 54, A, A).

Many patterns are planned upon the diamond, or its curvilinear equivalent the ogee, and by this means un-



The "Drop" Repeat.

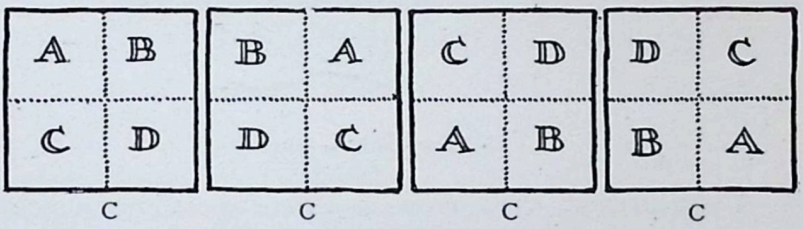


FIG. 54.—Method of "Proving" a Pattern.

pleasant horizontal lines are to a great extent avoided. The fillings, in those cases where the diamond shape represents the leading lines, are usually alternated, in which cases they do not drop (see Illustration 44, A). They may, however, be made to drop by designing the separate fillings alike, as is often the case.

"All-over" repeating patterns may be proved or corrected by cutting them into four equal parts and reversing their position as shown in the diagrams (Fig. 54, C). By this means their exact repetition may be determined, and the designer

is enabled to see how his design looks in different ways; moreover it is of material assistance in the actual designing and will upon occasion suggest new *motifs*.

Designs for wall-papers may either be treated in flat masses of colour without the employment of outline, or outline may form a feature of the design. The first-named method is suitable for large and bold effects, and especially in the cases of those designs printed in a single colour. Many excellent designs are produced in flat tints of several colours, and this system gives breadth to a design which the presence of an outline tends to destroy.

A B

FIG. 55.—White Lining.

The treatment of the outline is of the utmost importance to those designs in which it forms a feature, and, therefore, should receive the greatest consideration. It may be uniform in width, or it may be varied in this particular, but in either case the same character should be preserved throughout.

An outline may be emphasised by means of a system known in black-and-white illustration as "white lining"—*i.e.*, the background as well as the various tints of the ornamentation may stop off short of the outline, giving the effect of a double outline, greatly enriching the pattern thereby (Fig. 55, A).

Similarly, in designs depending mainly upon outline for

their effect, the outline is also made to stop off short, giving a less severe effect than when joined (B).

Backgrounds also are capable of much variation. They may be treated in flat colour of various strengths and tone; they may be broken up by a series of spots; of lines, horizontal, perpendicular, diagonal, cross-wise, wavy; by different diapered ornaments; or the principal pattern may be superimposed on a patterned background, conventional or semi-naturalistic, smaller in character and having a secondary decorative value to the leading *motif.* This principle of superposition may be extended to the principal forms, such as large flowers, leaves, &c., which are themselves patterned in various ways. These are called "inhabited" designs, an excellent example being given in the wall-paper by Mr. J. H. Dearle (Fig. 51).

It will thus be seen that, even within the limits imposed by material and method, the resources open to the designer are considerable; that as a matter of fact these very limitations suggest, indeed determine the treatment; and that the only way to successful accomplishment is for the designer to set about his work in a systematic way, and carry it out in a workmanlike manner.

PRINTED FABRICS.

Broadly speaking, the method of setting out "all-over" patterns for printed and even woven fabrics is the same as that already described for wall-papers; there is this important difference, however, too often insufficiently considered even by practised designers, that whereas a wall-paper is always seen in *flat*, textiles are usually seen in a series of broken folds, these foldings tending to complicate the pattern, and complicate it in proportion to the number and closeness of the folds; and while it would be dangerous to lay down the law that as a result of this complication the patterns of textiles should therefore be treated more simply, it may be pointed out that much of the beauty

and sense of fitness in the designs of mediæval brocades is due to the comparative simplicity of their setting out. Even a carpet is always viewed at an angle, and therefore the designer takes this important fact of perspective into consideration in planning his design. Moreover, the quality of the material influences, or should influence, the character of the design. A material poor in itself needs detail to give it interest, whereas the richer stuffs seem to call for a bolder treatment.

Printed fabrics, which include silks, velveteens, cretonnes, chintzes, muslins, cloth table-covers, felts, &c., are printed from engraved wood blocks, either by hand, or on a copper roller by machine, block hand-printing being usually reserved for the more expensive materials. It may be mentioned that in the cases where close detail or fine outline is employed, brass wires are introduced for the purpose of the better wear of the wood blocks.

We have here two distinct processes, demanding different treatment and producing different results, the former the more simple, primitive, but more artistic treatment, the latter involving greater detail and finish, employing all the resources of gradation of tone, but having a harder and more mechanical effect.

As in wall-paper, each colour introduced in the design necessitates a separate block being cut and consequently a separate printing; the colour statement therefore should be made as clearly and directly as possible so as to facilitate the work of the engraver.

Upon occasion, and for such details as the centres of flowers, the tips, turnovers of petals and leaves, a certain amount of superposition of the colours is possible, thus giving a greater number of colours than the blocks used—*i.e.*, a red on yellow produces orange, a blue on red produces purple and so forth, but this colour superposition should be employed with great caution, and only by designers of some experience.

In machine-printing the full scale of tones is possible, from the full black, or solid colour, to a series of lines of varying thickness, ending in a graduated stipple. This is to a great extent possible in one roller, but more usually two or more rollers are employed.

A very usual method is to express the outline and complete modelling in a single colour with one roller and to produce the local colour in flat tints by means of a second roller.

There is also a method of producing reversible cretonnes by printing on both sides of the material. Two sets of rollers are employed, and as the prints on either side must exactly tally, the simpler the design, the more easily workable it is.

Cretonnes are printed to a uniform width of 30 inches (the width, however, varies with different materials); the repeat must therefore be a division of this dimension, as 5 inches, 6 inches, 7½ inches, 10 inches, or 15 inches. As in the case of wall-papers the size of the blocks must not be too large for the workman to handle—*i.e.*, 24 inches at the outside, with rollers the depth varies from 15 to 30 inches. The "drop" repeat may be employed, and the method above described is substantially the same for all printed fabrics, taking of course the fact into consideration that the character of the material demands its own special treatment (Fig. 56).

With floorcloths and linoleums we deal with a different method of production. The designs are printed in *oil* from wood blocks prepared in a particular manner, the outline block being printed last and kept distinct, as outlines are printed with colours of a more solid consistency than are flat masses. Shaded effects are possible, but each colour or tone must be printed on dry ground, not on another colour; in other words, the colours must be made to *dove-tail*, as all colours are printed wet. Simple repeating patterns in flat tones are best adapted to this

FIG. 56.—Designs for Cretonnes, by C. F. A. Voysey.

material, and as large areas are frequently covered the effect of perspective must be taken into consideration.

The width of floorcloths is 18 inches; the repeat must therefore be 18 inches × 18 inches, or a division of this measurement, as one-half, one-third, one-fourth or one-sixth.

Body colour is invariably employed in making the drawings, and is, doubtless, the most satisfactory medium.

TEXTILE FABRICS.

Textile fabrics cover a very extensive field. In its widest acceptation, the term "textile" means any material wrought in a loom, involving the interlacing of threads of any substance in such wise as to produce an unbroken web, the long perpendicular threads being called the warp, the cross threads the weft or woof. The warp is always affixed to the loom or weaving machine, while the woof, which is usually of a richer and costlier material than the warp, is contained in the shuttle manipulated by the hand of the weaver.

It would be unnecessary, even if it were possible, to explain at any length the different processes of loom weaving. A mere catalogue of the different varieties of stuffs would be impracticable, the most that is practicable being to give a few general directions as to scale, materials, and general method of procedure for the designing of the best-known and more important fabrics.

SILKS.

Damask.—This is a figured or patterned material with an absolutely flat surface, in which the ground, its richest portion, resembles satin, the figuring or patterning remaining dull; the back of the material being exactly the reverse of the face. Damasks are woven to the widths of 21 inches, 31¾ inches, and 63 inches. The length of the

repeat may vary within reasonable limits at the will of the designer. Long repeats look more handsome, but the cost is increased thereby.

The designs are made in pencil or crayon, on either white or tinted paper: in outline, or with shading, as the case may be. The material being in self colour, tinted drawings are not needed. Damasks are often worked in wool or a mixture of silk and wool, and, of course, linen and cotton for tablecloths, &c.

Brocatelle is a variety of damask, with this difference, that the pattern is *raised* in satin, and is therefore the richest portion of the material. In brocatelle the figuring is made to cover the largest area, thus giving the maximum of richness and effect, and calling for boldness of treatment in contradistinction to damask, in which the effect of the ground is the greatest consideration. The sizes are the same as for damask.

In materials used for hangings, the foldings should always be taken into consideration in the planning of the design. Bold curves and oblique or horizontal setting of the design serve to emphasise the foldings, while vertical lines are objectionable. When borders are introduced their repeats must be equal to, or a division of the filling.

Brocade is a polychrome material of great richness and splendour, into which metal threads are often introduced. It is produced by means of the "Jacquard" loom, the figuring, occasionally highly elaborated, being in the woof or weft. The width is generally 24 inches and the repeats a division of this measurement. The medium for working drawings is either water colour or body colour.

The designer should study the fine early damasks and brocades of the thirteenth to fifteenth centuries, during which period the art attained perhaps its highest development. These will provide innumerable suggestions which may be adapted to modern ideas.

WOOLLENS AND COTTONS.

Chenille is a woollen fabric of cut pile dyed to a great number of different shades. The repeats, which usually measure 9 inches, may be reversed, as it is possible to reverse the pattern in the weaving—*i.e.*, from left to right, as well as from right to left. The width for curtains is 1½ yards and 2 yards; the borders 9 inches. It is also used for furniture and other purposes. The sizes are 3 feet × 1 foot 6 inches, 3 feet × 3 feet, 3 feet × 4 feet 6 inches; the designs for these covering the whole field, with no repeats. Body colour is the medium.

TAPESTRIES.

These coloured fabrics vary considerably in their quality; in the best the weft is of wool upon a silk ground. Others are all wool, or a mixture of wool, jute and cotton. Not more than six colours should be introduced; half tones are, however, produced by the interweaving of warp and woof. Furthermore, all curvilinear forms are produced in the tapestry by a series of short, straight lines, either horizontal or perpendicular. The repeats as a rule are either 9 inches or 18 inches wide. Any increase in length increases the cost of production. The border should be on the same ratio—*i.e.*, 6 inches, 9 inches or 18 inches.

CARPETS.

In the designing of carpets we deal with a totally distinct technique to any we have heretofore considered. It is, as a matter of fact, a form of mosaic of sharply defined patches of colour in tesselated form; it involves the thinking in *masses*, and in masses of *colour* rather than form, which in this class of design is a secondary consideration.

Roughly speaking, for the purposes of the designer, carpets may be divided into three classes :—

1. Those produced by a "Jacquard" loom; these include "Brussels," "Wilton," and "Kidderminster."
2. "Axminsters."
3. "Tapestries."

In Brussels the warp consists of five layers or "frames" of threads looped over wires to form the pile, each representing a different colour, and each loop representing a single patch or square of the design, each row of squares being called a "wire." The design, therefore, must not have more than five colours on any line in the

FIG. 57.—Planting.

direction of the length. Extra colours may be introduced by a method known as "planting"—*i.e.*, the dividing of one or more of the frames into bands of colour lengthwise. A strip of paper, painted in divisions with the various colours intended to be used, is prepared and placed across the design to show how far the planted colours may be distributed (Fig. 57). The beginner will, however, be wise to confine himself at first to five colours, which may be chosen at will.

Borders should form a pleasant contrast to the fillings, but the general character of the latter should be preserved in the border.

Designs are made to scale, but the ultimate working drawing is made either full size or half-size on paper ruled to a series of squares, the number of squares or points being called the "pitch," these squares being filled with

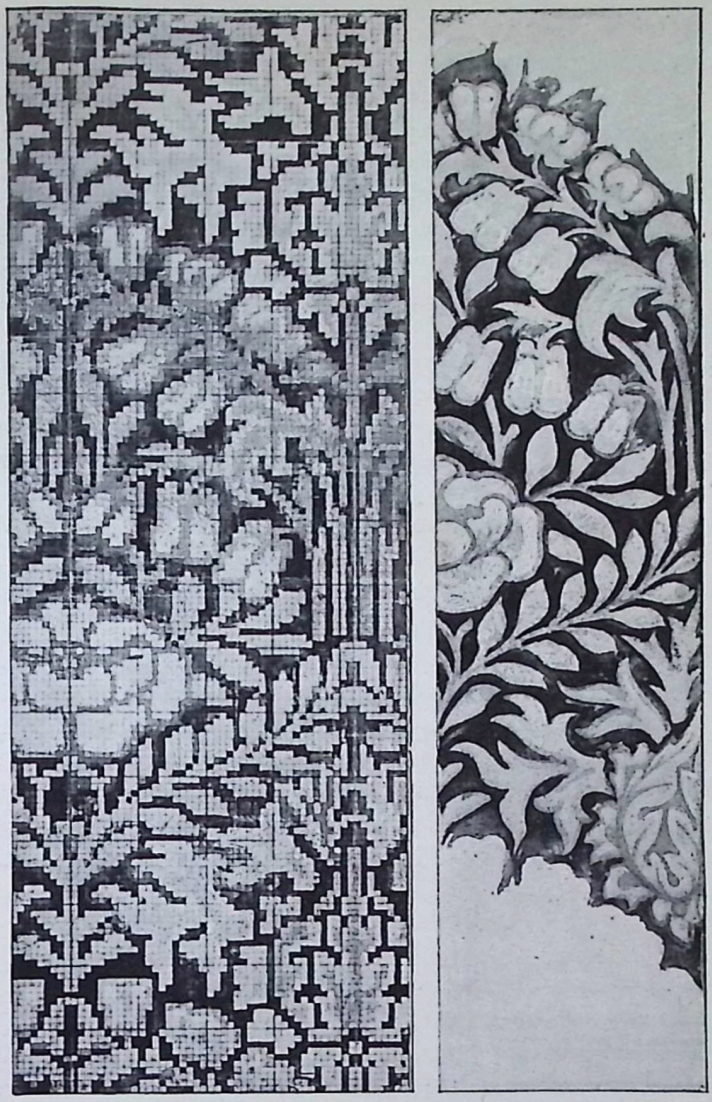


FIG. 58.—Design for a Carpet with squared working drawing, by William Morris. (By the Courtesy of Messrs. Morris & Co.)

patches of different colour exactly as in mosaic. The "pitch" varies in different makes, the average being from five to nine points to the lineal inch, nine for Brussels, and from five to seven for Axminster. It will be seen, therefore, that very fine detail is practically unworkable. On the other hand, if the design is too broad in treatment the effect is heavy and clumsy.

The two illustrations given will serve to show the difference between the original design and the translated working drawing (Fig. 58).

The width of Brussels designs is 27 inches; of borders 13, 18 and 22½ inches. The medium used is body colour, used solidly, each colour being mixed separately so as to produce uniformity of tint. The length of the repeat depends upon the character of the design, and whenever practicable the "drop" should be used. This applies to all carpets except "Kidder" squares.

Borders should form a pleasant contrast to the fillings, but the general character of the latter should be preserved in the border.

In "Axminster" the designer is not limited to comparatively few colours as in Brussels, and the device of "planting," therefore, is not necessary, as many as thirty different shades or even more being practicable. The pattern in these carpets is formed by neither warp nor weft, but by a series of threads inserted in various ways forming a "pile." The sizes are the same as for Brussels.

CHAPTER IV.

BOOK DECORATION.

PAGE ORNAMENTATION AND ILLUSTRATION.

FIG. 59.

IT is to be understood that the subject chiefly considered here is that of the *printed* book, and particularly those books produced by the various mechanical processes.

The most reasonable position for the writer of a text-book on design is to proceed upon the assumption that the student knows nothing, and that he has everything to learn, otherwise it would scarcely be necessary to demonstrate the *rationale* of the proper proportioning of a page: so much good fruit having been borne from the seed, first sown by William Blake at the end of the eighteenth, and carefully nurtured and ripened by William Morris in the latter decades of the nineteenth century, that even the most ordinary class of books has not remained unaffected by it.

Two arrangements opposite in principle of page proportioning are illustrated (Fig. 60). Why, it may be asked, is the first bad and the second good? The answer is that the first represents monotony, the second variety and therefore added interest; each side of the white margin in the second illustration being of a different width. It

has now come to be generally recognised that the two pages of an open book should be considered as one decorative whole; that the space decorated should represent the *optical* rather than the actual centre of the page; that this method of arrangement gives distinction to the page, just as in all great portraits the head is well set up in the picture.

The selection of good type is essential. The proportions of the individual letters should be considered, as also the spacings between the lines, on which latter the effect of the page chiefly depends.

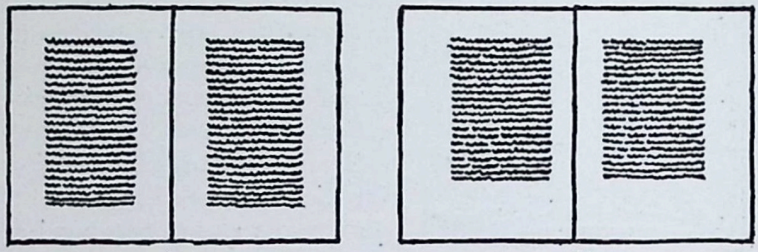


FIG. 60.—Page Proportioning.

There are two different systems of decorating a printed page:—1. By means of head and tail pieces and ornamental initials; 2. by enclosing the type within a decorated border, which may also enclose a picture or initial as the case may be.

If the book be decorated throughout by border designs, it involves one of two things—either much repetition, or considerable expense. Mr. L. F. Day has put it upon record, that even the fine borders designed by Morris for the Kelmscott "Chaucer" somewhat pall by their repetition.

If an unsymmetrical form of border be adopted, and upon the whole, it is the best form, the border is reversed on the

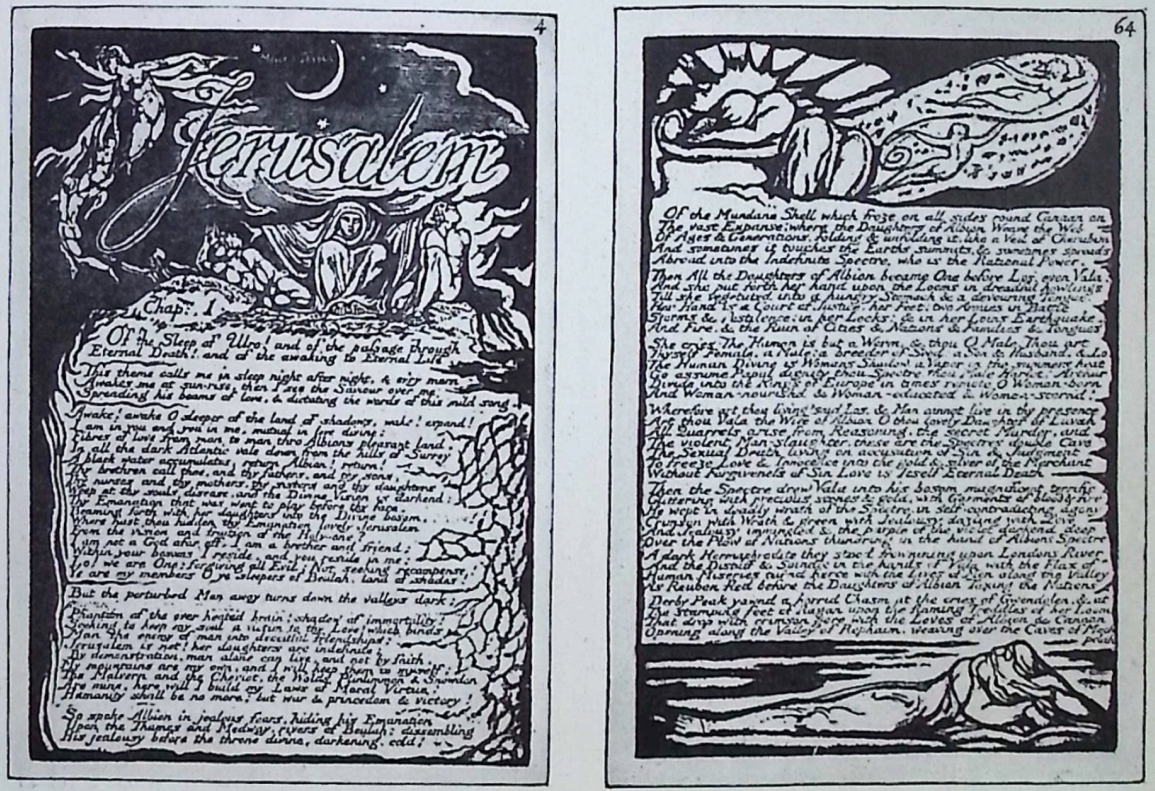


FIG. 61.—Two Pages from Blake's "Jerusalem."

opposite page, thus giving an added variety and restoring balance.

Ornamental initials may be enclosed within a panel or they may be decorated in various ways. They may be treated with or without a background according to fancy, or as the exigencies of the page demands; under any circumstances, however, a good standard type is far preferable to any fanciful form of letter.

There are two distinct methods of black-and-white illustration for reproduction by photographic process—line and wash. For the first named, either pen or brush may be employed, the chief *desideratum* being a clearly drawn line with no ragged edges, using a full black ink (any of the India inks sold for the purpose) upon a smooth, dead-white paper or cardboard. This is necessitated by the process known as "zinco," by far the simpler and cheaper of the various reproductive processes.

The wash process scarcely comes within the scope of the decorative book, and is chiefly employed for illustrations of a distinctly pictorial character, for much magazine illustration and works of a more or less topographical sort. In view, however, of the recent development of colour processes and the rise of the decorative colour book in which wash plays an important part, it may be well to explain the *rationale* of this method of reproduction.

The result is obtained by breaking up the tone of the original into stipple or grain by means of a transparent screen formed of two sheets of glass which are ruled with lines crossing each other, causing the high lights of the original to be represented on the negative as more or less round transparent dots, giving on the sensitised copper plate a fine network or chess-board pattern of lines of varying depth or strength, the plate afterwards being subjected to the action of acid. This in the briefest possible terms is the process known as half-tone engraving.

The three-colour process is a system of superimposing

FIG. 62.—Bower Maidens, by Annie French. (Specially drawn for this work.)

three prints one over the other from three half-tone blocks, yellow, red and blue, the result giving the colour value of the original.

The colour illustrations of Mr. Arthur Rackham, which have obtained such wide vogue recently, are wash drawings on a pen-line foundation, the tone of colour being kept very low. They are distinctly decorative in their treatment, and the drawings are admirable instances of expressive line work.

Black-and-white illustration, either line or wash, either decorative or pictorial, resolves itself into the three divisions of black, white, and half-tone, the latter of varying degrees from the pure white to the full black. A picture or design may be said to be a play upon these three divisions with their subdivisions; it becomes, as in a musical composition, a question of finely balanced and carefully considered quantities; the strongest dark must take its proper place in the design and be gradually led up to form the highest light, or contrasted as the case may be (Figs. 61, 62, 63).

The scale of drawings for process illustration should not be too large, otherwise it is difficult to gauge the effect of proportion on the reduced block even by the aid of a diminishing glass. One-fourth larger than the size required is a good rule.

TITLE-PAGES.

Since the invention of printing, title-pages have been produced by means of—1. Woodcuts; 2. metal engraving (copper or steel); 3. etching, or, as was usual in earlier engraving, a combination of etching and engraving. With the introduction of the various reproductive processes, they have usually been drawn in pen line, or, in the case of plain titles, set up in type.

The earlier engraved title-pages were often extremely

FIG. 63.—The Dream—"Romaunt of the Rose," by Jessie King. Pen Drawing on Vellum, with Gold Enrichment.

elaborate, and occasionally very admirable works of art, both in point of design and execution, so much so that many books, such as Gerarde's "Herbal" and others, have been rifled of their title-pages by collectors for the sake of the engravings, copies of Gerarde with title-page complete being quite rare. In most old books, whatever the process employed, the title-page received very careful consideration.

In addition to the title, with sub-title (if any), the page should bear the name of the author, the name and address of the publisher and date of publication. These may be said to be essential, any decorations, embellishments, &c., being purely a matter of taste. The careful planning and setting out of the lettering is therefore the first consideration in designing a title-page. Any of the standard forms of letters, Roman, Gothic, Cursive, may be used, but they should be of a good character and founded on the best examples. Many good title-pages have been set up in type, the only considerations in these being the selection of a good type, and the proportion and spacing of the lettering.

If the lettering be drawn, and drawn letters, provided they are well drawn, are always preferable to type, the aim should be to avoid the somewhat mechanical appearance of type—*i.e.*, the fact that it is a drawn hand should be frankly accepted, the "flavour" of freehand work should be retained.

A good publisher's mark will provide very excellent and appropriate ornamentation for a title-page, the ornamental mark forming a good contrast to the lettering. Many admirable marks have been produced during recent years for various publishers, the one designed by Mr. Walter Crane for Messrs. Lawrence and Bullen may be cited as an instance.

In place of the publisher's mark, a portrait of the author, if he be a standard author, may be substituted. This has been done by William Morris in an illuminated title-page for "A Book of Verse," 1870, in which the painted portrait

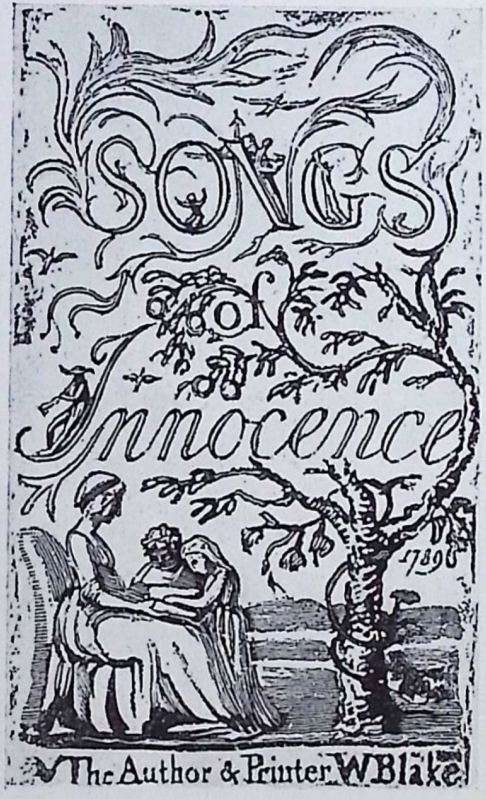


FIG. 64.—Title-page, "Songs of Innocence," by William Blake.

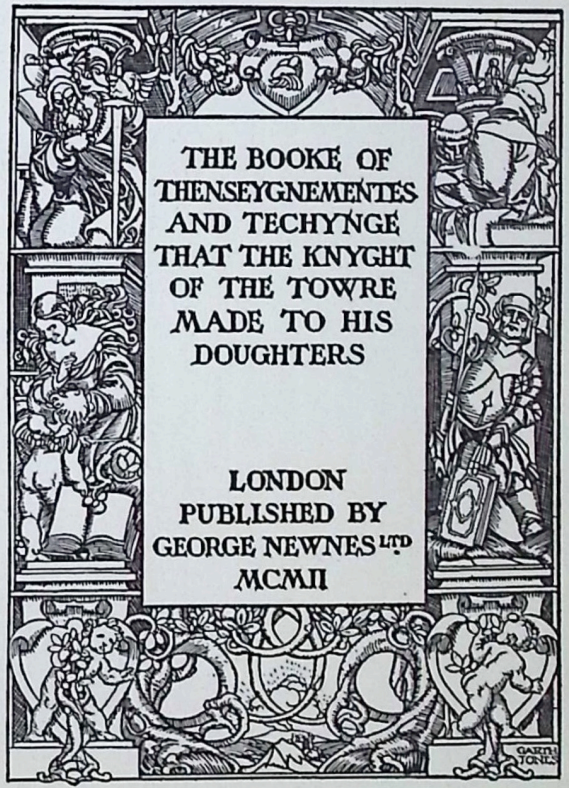


FIG. 65.—Title-page, by Garth Jones. (By the Courtesy of Messrs. Newnes.)

is enclosed within a circle in the centre of the page, the field of the page being filled with an "all-over" foliated pattern, and four figures of musicians introduced. In the older printed books, however, the portrait more usually forms the frontispiece, the title-page being more or less plain.

Ornamental title-pages may be designed on various systems—1. The lettering may be enclosed within a border more or less elaborate either on the symmetrical or unsymmetrical system. 2. It may be placed on a scroll, tablet, cartouche or other ornamental device, the field being filled with either an "all-over" pattern, or a more or less naturalistic arrangement of plant form or figures, the scroll, tablet, &c., serving the purpose of separating the lettering from the ornamental portion. 3. The lettering may be incorporated with the design without any such separating devices, as in the extremely naïve title-page for Blake's "Songs of Innocence" (Fig. 64). 4. The title-page may be a combination of lettering, border, and enclosing picture or other device. In all cases, the decorative *motif* of the design should be appropriate, and whenever possible should suggest the character of the book.

A tree is quite an appropriate *motif*, and is often adopted for both title-page and publisher's mark, the tree with its roots in the ground, throwing out branches and bearing fruit, being symbolic of the book and its various parts.

The frontispiece and title-page, which invariably face each other, may be designed to form one decorative whole, in which case the employment of some form of border would appear to be a necessity. An example is to be found in the very original and accomplished design by Mr. Laurence Housman for "A Farm in Fairyland" (Fig. 66), in which the border is unsymmetrical, reversed on the frontispiece, and enclosing in the latter an illustration to one of the stories of the book.

The introduction of a second colour, usually red, is

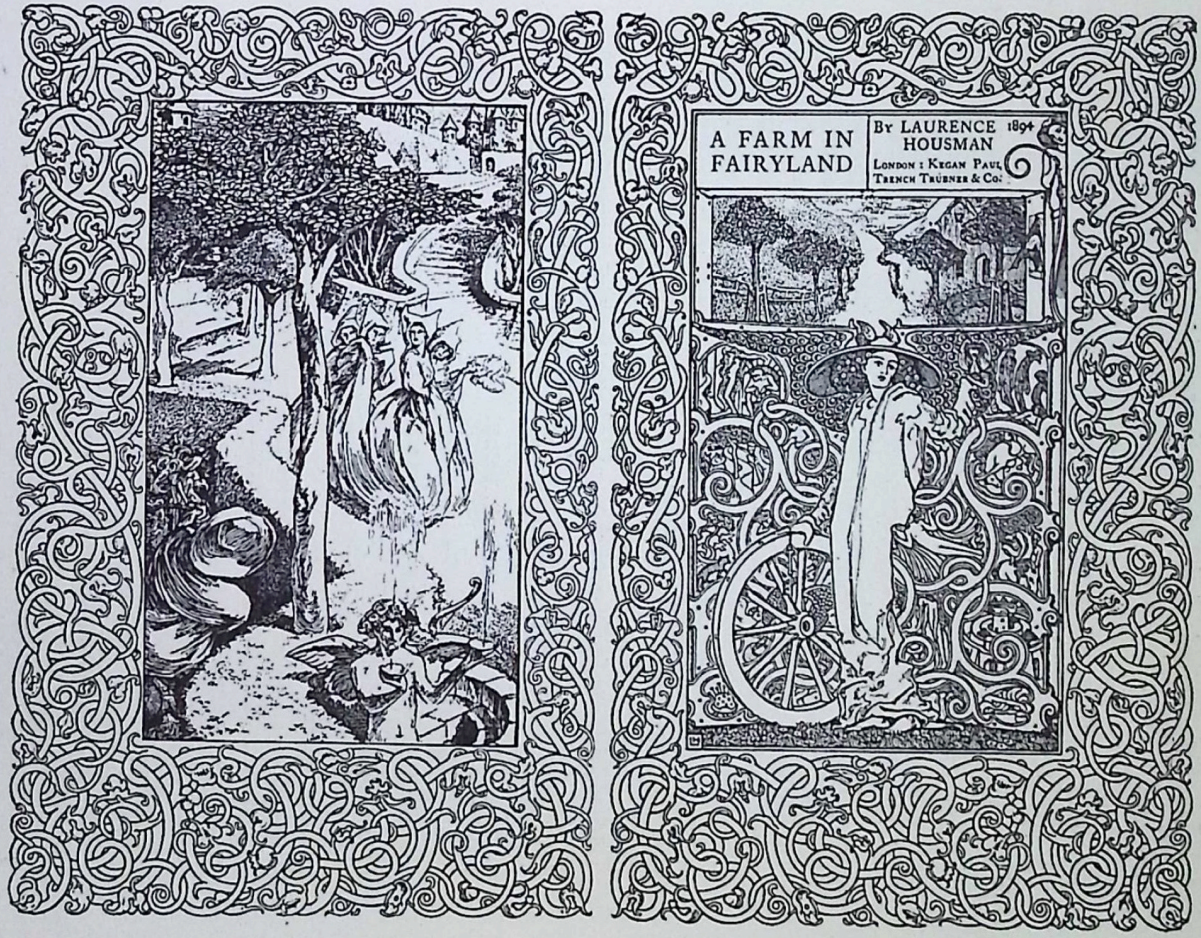


FIG. 66.—Frontispiece and Title-page, by Laurence Housman. (By the Courtesy of Messrs. Kegan Paul, Trench, Trübner & Co.)

common, the principal title being in red, the rest in black. This colour note is often extremely effective.

There are two different opposing systems employed in the arrangement of the lettering of a title-page—the one in which the various parts of the inscription are in different sized letters, the lines of letters being necessarily of varying length; the other in which the letters are of a uniform size, in which case it is so arranged as to completely fill a given space on the principle of Roman inscription.

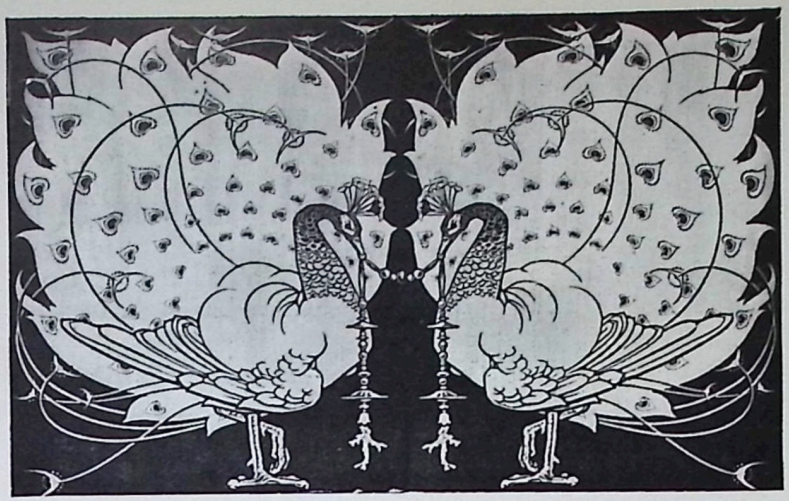
In the former case the lettering of the title is largest in size, it is placed in the most prominent part of the page, usually near the top, to be seen and read first, the rest of the lettering of the page being subsidiary. The author's name may be above or below the title, usually, in the case of English books, it is below. Both capital and small letters may be employed, the two forming a pleasant contrast, or Cursive letters may be used, and good Cursive characters look very well.

There is something to be said in favour of the second method of arrangement, which gives a certain distinction to the page, Roman capitals being invariably employed.

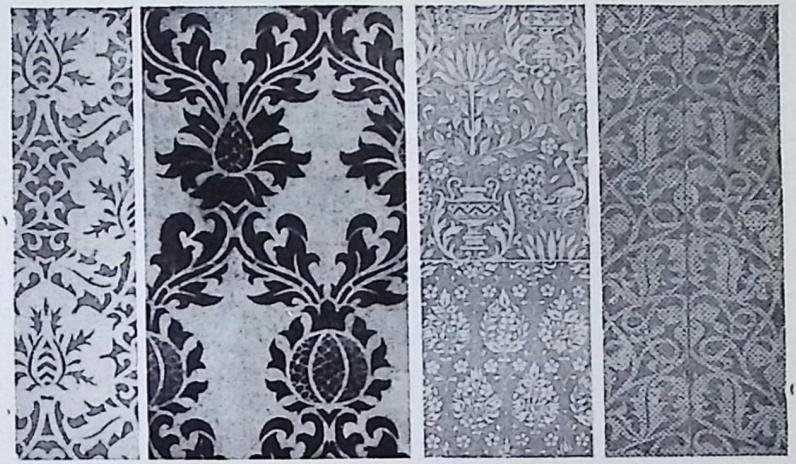
END PAPERS.

These are the white, tinted or patterned sheets, usually called fly leaves, placed by the binder at the beginning and end of the volume, one-half being pasted down on the inside of the cover for the purpose of hiding the doubled edges of the leather, linen, or paper stays, &c., of the binding, and therefore providing a finish to the inside of the cover. For the cheaper books plain paper was and is used, for the more expensive ones it was a common device to decorate the end paper with a printed pattern in imitation of marbling of various kinds and in various colours.

Since the rise of the modern decorative art movement, however, it has become usual to substitute for the marblings designs of a more ornamental kind, these usually taking the form of all-over repeating patterns made up of either



A



B

C

D

E

FIG. 67.—End Papers. A, Paul Woodroffe (by the Courtesy of John Baillie); B, E. G. Reuter; C and E, Ada Jones & C. F. M. Winsborrow respectively, Bolt Court School of Photo Engraving; D, A. A. Turbayne (by the Courtesy of Messrs. W. Thacker & Co.).

purely abstract ornamental forms, or taking some floral form as a *motif.* A common and very excellent device is to incorporate in the design the monogram or initials of the publisher (or in some cases the author and publisher) as in an admirable design by Mr. A. A. Turbayne (Fig. 67, D), in which the initials W. T. & Co. (W. Thacker & Co.) are introduced in an interlacing pattern based upon the Water Lily.

The principle of setting out end-paper designs is the same as that for most all-over patterns, such as wall-papers, chintzes, &c., the chief considerations being the scale of the design, which should be in harmony with the size of the book; and the method employed, which should be line or flat black for reproduction by the "zinco" process, any introduction of light and shade being obviously out of place, besides necessitating the more expensive and elaborate process of half-tone engraving.

The sheet of designs by Mr. E. G. Reuter (Fig. 67, B) are made up of various ornamental forms on the all-over principle, and are produced by a method invented by himself, a kind of photographic process with negatives, some cut out of black tissue paper, and others painted with opaque black tracing paper, the advantage of this process being that it may be executed by amateurs when large quantities at commercial prices are out of the question, this process requiring no elaborate and costly printing presses. The majority of Mr. Reuter's designs are done on "Michallet" paper, this being inexpensive and providing a pleasant texture, and are printed in various shades of red.

It is, however, by no means necessary to confine end-paper designs to repeating patterns—figure subjects, treated of course in a decorative manner, have been successfully employed, an excellent example being "Lyrics," by Edmund Dulac. Mr. Walter Crane's design for the end papers of his "Bases of Art" is an example in which the human figure is introduced with admirable effect and

skill. The design illustrated from "The Venture" (John Baillie) of a peacock filling the whole of the page, and reversed on the opposite page, is extremely handsome, and is printed in a pleasant low-toned green (Fig. 67, A).

In many instances the subject of the book will suggest the *motif* for the end paper, and in all cases suitability of idea, scale and general decorative fitness must be carefully considered.

EX-LIBRIS.

The practice of indicating the ownership of a book by means of an engraved name-plate dates to a period within 30 years of the invention of printing in the middle of the fifteenth century; the earliest known movable *ex-libris* being wood-cuts representing shields of arms supported by an angel, pasted in books presented to the Carthusian monastery of Buxheim by Brother Hildebrand Brandenburg of Biberach, about 1480.

The craze for collecting book plates is quite modern. An *ex-libris* society has been formed, numbering many members, and issuing a monthly journal devoted to this subject. The number of artists, able and otherwise, essaying book-plate designing is considerable; the number of collectors almost legion.

As regards methods, practically all the various reproductive processes have been in requisition:—Engraving on wood and metal, the former in several colours; etching; lithography; chromo-zylography; and, during the last 30 years or so, process reproduction.

Wood engraving was one of the earliest methods employed; its use has continued during all subsequent periods; it finds most able exponents at the present time. Nevertheless, admirable as it undoubtedly is, and entirely suitable to the purpose in view, it cannot lay claim to the dignity of engraved metal. It would serve no good purpose to discuss *pro* and *con* the rival claims in point

FIG. 68.—Etched Book-Plate, by G. W. Eve, R.E. (Slightly enlarged.)

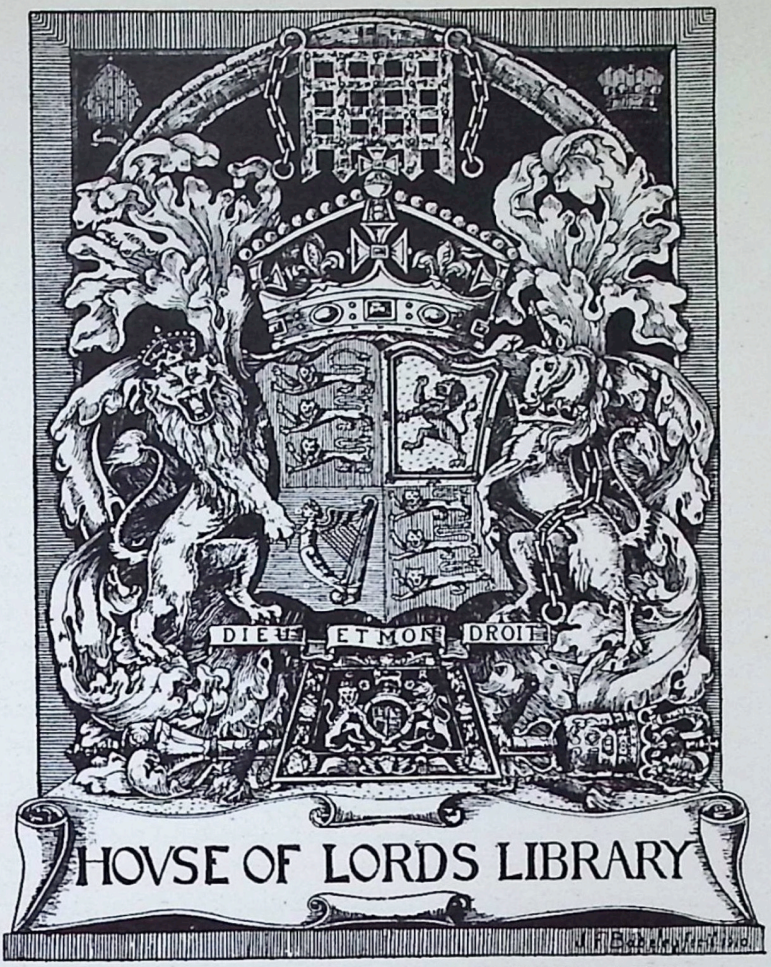


FIG. 69.—Etched Book-Plate, by J. F. Badeley, A.R.E.

of quality of the engraved and etched line, both have their peculiar characteristics. With the burin we obtain a clean, clear-cut line, giving a greater sense of finish—although by using the acid known as Dutch Mordant (hydrochloric) the utmost fineness of line and finish in

etching can be obtained—with the needle we have a greater freedom and sensitiveness of linear expression.

In justice to the artists whose etched work is illustrated here (Figs. 68, 69, 71), it must be pointed out that no process reproduction can give the peculiar quality of an etched plate printed and wiped by hand.

What, then, are the chief considerations in designing a book-plate? While it would be invidious to lay down any hard and fast rules, it might be desirable to point out certain limitations which the artist should observe.

The utility, the *raison d'être* of the book-plate is expressed in the schoolboy couplet—

> "Steal not this book for fear of shame,
> For here you see the owner's name"

for, doubtless, the moral laxity with respect to the return of borrowed books was as rife formerly as it is at the present time. It is therefore, primarily, a name label (decorated or not as the case may be) for the purpose of determining the ownership of a book. The name should be legible without being too obtrusive. The lettering should be of a good standard character, "fancy" letters being avoided. The dimensions of the design will be governed by the size of the book. The late Gleeson White favoured a small size, and says: "It may be safest to regard large sizes with suspicion, because it is obvious that, although a small size may suit all books from duodecimo to folio, a large one is absurd if not impossible for small volumes. . . . My own feeling is very strongly in favour of much smaller plates than the average, which are about the size of an ordinary playing card."

There is, unquestionably, much to be said in favour of this contention, and there can be no possible doubt that the ideal book-plate is that of a name-plate decorated, with true decoration rather than a picture for its adornment.

The example given by Mr. E. G. Reuter (Fig. 70) fulfils these conditions admirably, though this particular type of Gothic letter may be unfamiliar to most. The method employed for reproduction is the same as for his end papers already described.

As to subject, armorial bearings are always proper, and

FIG. 70.—Book-Plate, by E. G. Reuter.

heraldry undoubtedly possesses a dignity, from mere association of ideas, which no "fancy" picture can possibly give. Moreover, it has a great tradition, and while it is most desirable for the designer to study the finest old examples, there is still plenty of room for the exercise of any individuality he may possess.

Portrait book-plates are too seldom attempted, though they afford admirable opportunity for a dignified plate,

especially if armorial bearings are introduced, as in several magnificent examples by Albert Dürer. In these, perhaps, the chief consideration is the proportion of the portrait with the lettered label beneath (in one instance lettering appears both above and below the head) and the setting of the head in the picture, shields of arms decorating the plain spaces of the background. For portraits, probably etching is the best of all possible methods.

FIG. 71.—Etched Book-Plate, by Ethel King Martyn, R.E.

The subject after all is a somewhat secondary matter; the manner of its treatment is far more important, and whether it be heraldic, symbolic, topographical or merely ornamental, the chief considerations must be, as in all other branches of design, the purpose to which the thing is put, and the limitations of the method employed.

BOOK COVERS.

The cover is one of the last considerations in the setting up of a book. It is the dressing that should express the book precisely in the same sense as dress should express its wearer. The character of the book should therefore determine the nature of its dressing. A cover rich in idea, material and workmanship should not be married to a mean

book; a noble book would appear to demand a dignified dressing. These are hypotheses that would appear to leave no room for objection.

Book bindings divide themselves into two great classes—those produced by the handiwork of the craftsman, the material being leather (with which must be bracketed embroidery and the arts of the metal worker and jeweller), and those produced by the aid of machinery—generally a process of stamping or imprinting on some material such as linen, calico or paper.

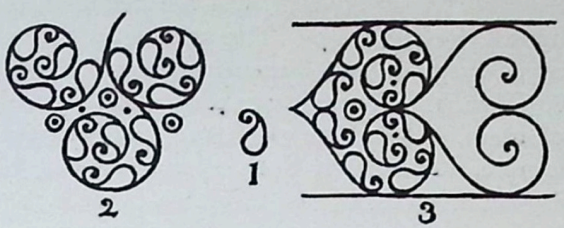


FIG. 72.—Tooling, with unit.

A clear understanding of the processes employed in leather "finishing" is essential to those who would essay designing for leather covers.

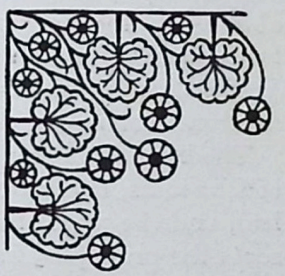


FIG. 73.—Tooled Border.

Put briefly, the method of gold tooling is as follows:—The leather is first washed—with vinegar for morocco, with paste water for calf—and when dry, a coating of albumen is applied to those parts intended to be gilt, with a sponge in the case of large surfaces, and with a camel-hair brush for smaller ones. The gold, cut on a cushion to the required size, is applied by means of a pad of cotton-wool, dabbed well down, the part having previously been well greased with oil, lard or vaseline. The tools, which represent the pattern, or rather the pattern units, since they are quite small, are heated at the stove or gas-pan, and

impressed upon the gold, the surplus gold being wiped off.

The tools, as above stated, represent the unit or units of the design; they may consist of an ornamental device, a leaf or a flower or both, and are cut in brass and fixed in a handle for working. The connecting lines are produced by gouges, or more recently by means of a little wheel or roulette, the line being cut upon the periphery of a disc of brass, moving on a central axis and furnished with a handle. It follows, then, that designing for tooled bindings consists in the building up, putting together or the decorative arrangement of these various units, or rather, put in different terms, the design must be an aggregate of various units, which units are capable of being made into a small tool of a size ranging from one-quarter to half an inch. The greater the variety of forms produced by the repetition of a single unit, the greater the economy of means effected. For example, with No. 1 as the unit (Fig. 72), we may obtain the all-over pattern given in No. 2, any gaping space being filled up by other tools consisting of circles or spots. Varied arrangements are arrived at by employing a different system of leading lines (3).

The border design given in Fig. 73 is produced by means of four tools, two for the different sized flowers, one for the leaf, and the wheel for the connecting lines. This represents the principle of all covers confined to the process of gold tooling.

The designs associated with the name of D. S. McColl and others of the Glasgow School, chiefly arranged on a system of curved lines, are planned specially to give exercise to the roulette tool perfected by Miss McColl, and have a character of their own, perfectly consistent with the method employed.

With gold tooling is associated the process of leather inlay in various colours, an old process but greatly developed during recent years, especially on the Continent,

where figure and other subjects are treated in a picturesque manner. This process finds such exponents as Lepère the engraver, whose leather chasings are well known and widely appreciated, René Wiener and many others.

Still another process remains to be noticed, that of relief, also a development of an old method. This may be executed in self-colour, as a matter of fact modelled with various tools. Relief work may be associated with both colour inlay and gold tooling, thus, as in the covers by René Wiener, employing at once all the resources open to the leather worker and carrying the treatment of the material to its utmost limit, occasionally, possibly, overstepping its legitimate bounds in the desire for novelty of effect.

The essential of a cloth cover is that it shall make no pretence to imitation of the qualities of leather workmanship, and that it should obviously be a cover stamp. The chief considerations, therefore, are those of decorative design, the only limitation the material imposes being in the fact that it is printed from an engraved brass plate, the lines of which are left in relief as in a woodcut, a high degree of pressure being employed in the printing. Considerable fineness of line may be obtained, especially in gold, which prints more clearly than colour, as is evidenced by those designs so popular a couple of decades ago and still produced, in which the effect of full light and shade is obtained. The best contemporary designers have, however, realised that the most satisfactory covers are those that depend on the effect of pure line and flat tint.

Many blocks are now made by the zinco-photographic process, and if drawings are made with due regard to this method, excellent results are obtained. The practice of making drawings, whether for process or otherwise, on tinted paper or cloth is not to be commended, as the range of binders' cloths is extensive. The colour scheme aimed at should, however, be kept constantly in mind.

One, two, or more colours may be employed on grounds

FIG. 74.—Leather Cover, Gold Tooling, by Louis Rhead.

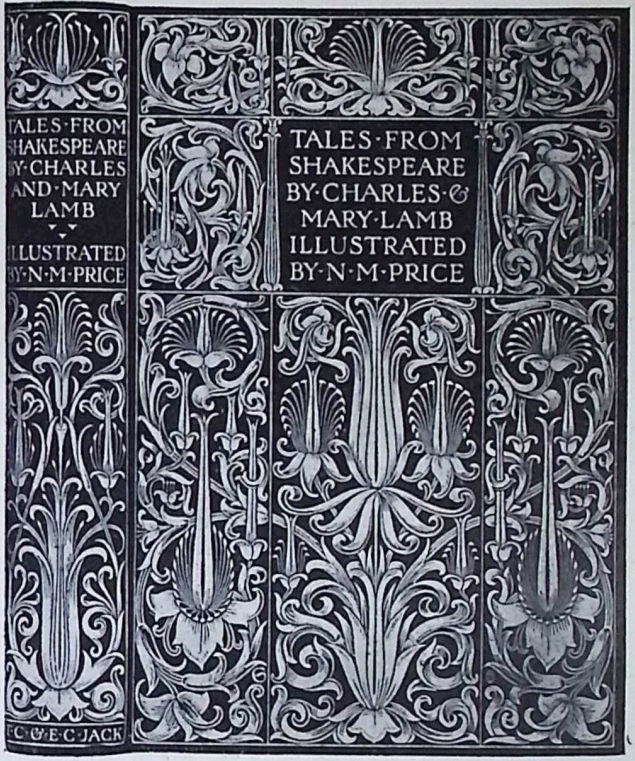


FIG. 75.—Cloth Cover, designed by A. A. Turbayne. (By the Courtesy of Messrs. T. C. and E. C. Jack.)

of various tints; colours may be associated with gold, or gold alone may be used, but with respect to the latter there are considerations of expense, gold on large areas being costly.

The effect of gold on vellum, occasionally used in lieu of cloth, is extremely handsome, but again, much more costly. White on coloured cloths prints quite well, but it will be obvious that with opaque white very close line work is undesirable.

White may also be associated with one or more colours on a tinted ground, and a very telling and forcible effect produced, perfectly suitable to certain classes of books. We have thus the full tonal scale of light, dark and half-tone. If the light and dark be treated in bold masses, the strongest contrast is arrived at. In a restrained and refined manner Mr. Walter Crane has adopted this method in the cover for "The Shepherds' Calendar."

In designing cloth covers, as in the case of title-pages, the first consideration is the arrangement of the title. This would appear to be an essential to the back in order that the book may be identified on the shelf, although it is by no means invariable in the case of tooled bindings. The author's name, also, usually appears, and the name of the publisher near the foot. Whether or not the title, with or without the author's name, is repeated on the face is very much a matter of individual taste, but in any case the disposition and character of the lettering is to be first considered. It would seem reasonable to expect to read the title whether the book appears on the shelf or upon a table, but in any event the lettering of the cover should not discount the work of the title-page. Moreover, lettering, whether on cover or on title-page, should be regarded as inscriptive and should not therefore require punctuation.

The "face" may be treated as a border enclosing the title or other ornamental device. It may be treated as an all-over pattern with the title in a panel at the centre, or above the centre; or, as in the cases of successful covers by

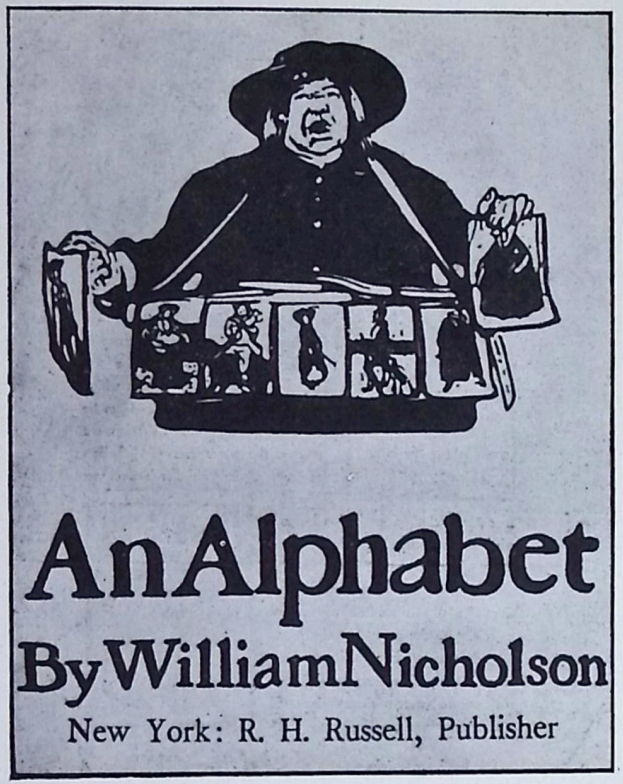


FIG. 76.—Cover, by William Nicholson.

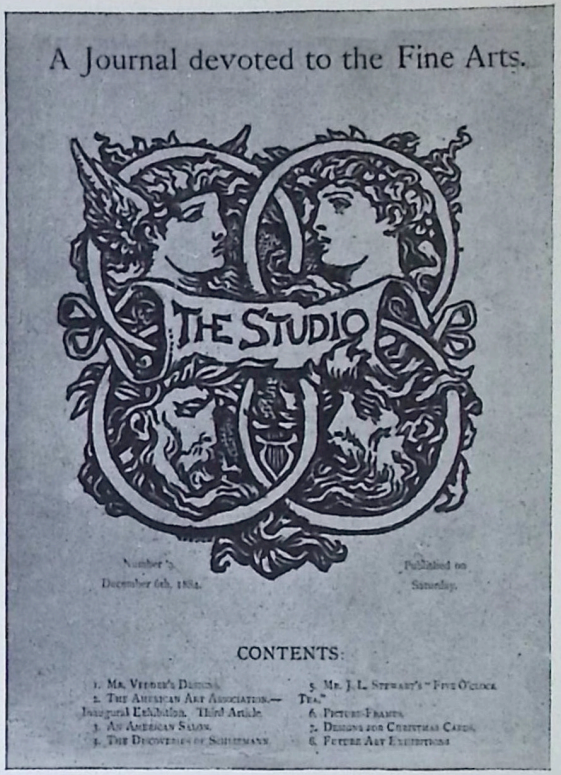


FIG. 77.—Paper Cover, by Elihu Vedder.

Mr. Laurence Housman, at the top corner or corners. The design may be symmetrical or unsymmetrical: it may take the form of a subject either enclosed in a panel or not as the case may be; in short, it may take any form the designer conceives to be suitable to the character of the book, but whatever be the character of the work on the faces, that character should be preserved on the back, which should, in fact, be a sort of *résumé* of the two "faces." The reverse "face" is often left undecorated, though there is a sort of incompleteness in this. Often enough it merely bears a publisher's imprint or other device. Again, it may be a repetition of the front, with a difference—the leading lines being preserved and the ornament treated more simply. Lastly, the whole of the cover,—the two faces, and the back may be treated as one composition, either symmetrical, the two faces being reversed, or as a semi-pictorial composition travelling through the three parts, the cover being so designed that each division appears complete in itself. Several successful examples might be named, notably the design for "Pierrette" by Charles Robinson, a fanciful composition of a number of child figures. This arrangement has even been adopted in the graver material of leather by René Wiener—a view of a river with bridges, and a female figure in modern costume on the face, the figure treated in colour—and by many other craftsmen.

There is still another consideration for the designer of cloth covers—viz., that good linen of a pleasant colour is satisfying in itself, the effect of the ground should not therefore be lost sight of. On the other hand, as the late Gleeson White very well said, "Plain cloth, especially the smooth varieties, is ruined by an accidental drop of water, or even the rubbing against other volumes: not to speak of the fading of fugitive pigments too often used in its preparation. Hence an added decoration may not merely adorn, but help to preserve, the appearance of a book."

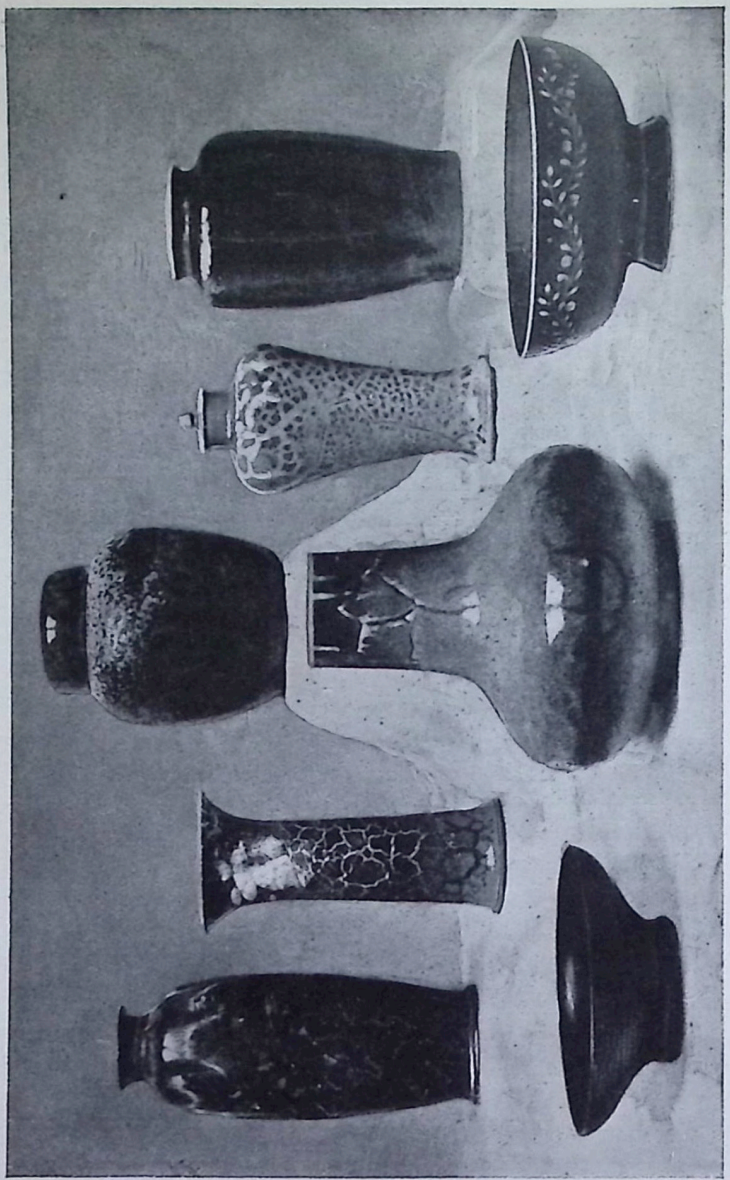


FIG. 78.—Group of "Ruskin" Ware, by W. Howson Taylor.

CHAPTER V.

POTTERY.

It is assumed that the would-be potter will not in the first instance desire to make his own experiments and go fully into the composition of bodies, glazes, or colours, but that he will accept, provisionally, and endeavour to make the best of the materials supplied by the different makers, and therefore ready to hand. For, although pottery in its more primitive form is a comparatively simple matter—Robinson Crusoe made some sort of a vessel, and the principle of glazing was practically forced upon him by the accident of the vitrification of the sand in which the vessel was baked—yet in its more refined form it involves considerable knowledge of chemistry and much research in a variety of ways. This chiefly from the first condition of its manufacture—that it must be submitted to the action of fire, and that, unlike metal, it is an exceedingly fragile substance.

The variety of bodies used in pottery is considerable, but the most important for present purposes are the following:—Terra Cotta, Earthenware, Majolica, Porcelain. Terra cotta is the lowest in grade of the above mentioned, and may be composed of almost any ordinary red or yellow clay.

Earthenware is composed of clay (ball or blue), ground flint, and occasionally China stone and is non-transparent. Three parts of either blue, black, ball or sanitary clay and one of ground flint will give an earthenware body similar to the ordinary cream ware.

Majolica is a much harder and closer body than either of the foregoing, buff in colour, and was the material used by the Italian potters of the fifteenth and sixteenth centuries, with a coating of stanniferous enamel, giving a white surface.

China clay is the product of the decomposition of a granite rock found in Cornwall, and the chief ingredient of porcelain, the rest being Felspar, Cornwall Stone, and Calcined Bones, the whole producing a translucent body.

FIG. 79.—The early British Potter, from "Staffordshire Pots and Potters," G. W. and F. A. Rhead. (Hutchinson & Co.)

There are three distinct methods of making pots. 1. Building, by means of coiling rolls of clay and filling in the intervening spaces as the work progresses, this being the process employed by all primitive potters (Fig. 79); by shaping from flat slabs of clay; or by carving from the solid clay. 2. Throwing and turning on a potter's revolving wheel. 3. Casting or pressing by means of a mould.

The clay is first crushed to powder either in a mortar or beaten with a mallet, made into "slip" by the addition of water passed through a 100-mesh sieve, and is either put into a plaster clay-box which will absorb the water or allowed to settle and the water poured off. Clay improves

by keeping; it must be kneaded, wedged or worked to a proper plasticity, a copper wire fixed to two pieces of wood for handles being used to cut and re-cut it during this process (Fig. 80) (1).

Built pottery is usually done on the wheel, a round plaster "setter" being used as a stand for the piece. The clay is rolled with the fingers into lengths of about 14 inches. When the coils of the base and a few inches of the sides are placed in position the spaces between the coils are filled in with smaller coils and finished with a toothed modelling tool and the rest of the piece proceeded with. A sponge with water, several modelling tools, a pointed knife, and a hard and soft brush complete the tools necessary for finishing. The piece is then allowed to dry slowly, and is then ready for firing or for subsequent decorating in scraffito or slip as the case may be.

The simplest form of potter's wheel is turned with the foot on a treadle; more usually an assistant turns a large handle at some little distance from the potter. The clay, in a very plastic condition, is thrown (slammed) on the *centre* of the wheel while it is in rapid motion, a basin of water being near, in which to constantly dip the hands. With practice the clay may be manipulated at will, by an embracing pressure of the hands, or in the case of hollowing, by pressure of the thumbs held downwards, the motion of the wheel becoming slower as the shape progresses (Fig. 80) (4). Allowance must be made for considerable reduction by the turner. When the shape is completed it is to be held with both hands while a second person cuts it from the disc with a copper wire. It is then partially dried, and, when in the proper condition, is finished by the turner with steel cutting tools again on the revolving wheel. It is then placed in the drying cupboard, and, when thoroughly dry, is ready for the oven.

Casting is effected by means of pouring slip about the

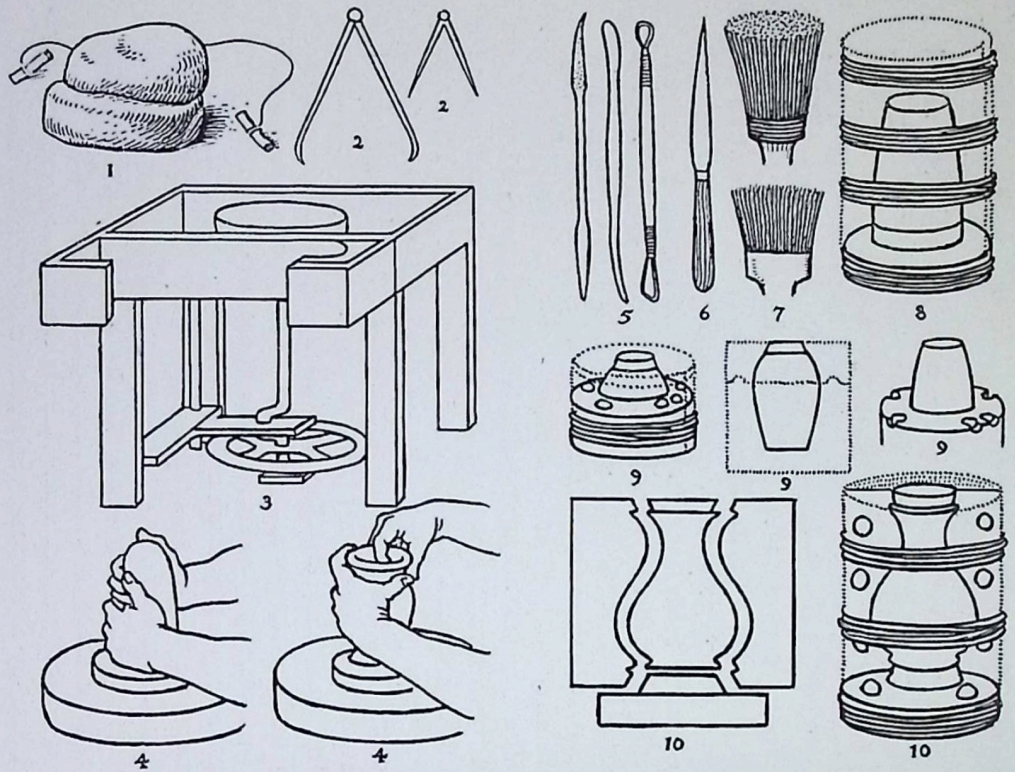


FIG. 80.—1, Wedged Clay with Wire Cutter; 2, Callipers and Compasses; 3, Side-throwing Wheel; 4, Throwing; 5, Modelling Tools; 6, Knife; 7, Round and Flat Brushes; 8, One-piece Mould; 9, Two-piece Moulds; 10, Three-piece Mould with Profiles.

consistency of thin cream into perfectly dry plaster moulds, that absorb the water and harden the clay next to the mould, which is refilled several times with slip as the absorption of water continues. After a sufficiently thick layer is hardened the surplus slip is poured out; it is then allowed to dry gradually, causing the piece to contract, and when strong enough, the mould is opened, the piece taken out and finished—*i.e.*, the seams caused by the joints of the mould and any other imperfections are trimmed with a sharp knife, cleaned with a sponge and dried.

A model is first made in either plaster, clay or wax from a measured working drawing, allowing for the contraction of the clay, which varies considerably, in some cases 3 inches, in others, as white earthenware, three-eighths of an inch to the foot.

Moulds may be made in one, two or three pieces; for plain cylindrical shapes a one-piece mould is sufficient. The model is placed in an inverted position on a cushion of clay. A piece of linoleum or other sufficiently rigid material is bound round the support to form the well into which the plaster is poured (Fig. 80) (8).

A two-piece mould is formed of a base and top, a three-piece mould of two sides and a base, the two sides formed of plaster profiles; in both two and three-piece moulds knobs of clay at irregular intervals must be placed on the support and the profiles for the purpose of locking the mould and keeping it in position (Fig. 80) (9, 10). Handles are pressed and spouts are cast, the first being solid and the second hollow.

Pressing is used for flat ware, tiles, bowls, or any solid pieces of architectural mouldings; it possesses some advantages over casting, as the ware is not so fragile in the clay state and the method is surer—*i.e.*, there is less waste.

The clay must be thoroughly wedged—*i.e.*, beaten

FIG. 81.—Embossed Tiles for Ceiling Decoration, by T. R. Spence.

until it is completely homogeneous and firm, with no air holes. It is then flattened out on a block with a batter, which is a thick slab with a handle at the back. The slab of clay, after being polished with a knife, is taken in the palm of the hand and applied to the mould, the clay being manipulated with gentle pressure from the edge, working to the centre.

One of the principal methods of decorating the unfired clay is by means of slip, which is dropped, poured or trailed from a spouted vessel resembling a teapot (Fig. 82) (6). It was much employed by the old English potters of the seventeenth and eighteenth centuries, usually on a red or buff ground. Underglaze colours may be mixed with the slip, the design being traced on the piece with India ink, which fires away.

The process of Pâte-sur-pâte introduced into England by Mr. Solon from Sèvres, is a development, or rather refinement, of the primitive process of slip decoration. The piece is either grounded with a layer of colour or a coloured clay is used, the slip applied with the brush and finished with modelling tools.

The process of scraffito is also used in conjunction with slip decoration, and is much practised at the present time.

The different conditions of the clay state are as follows:— Very soft, when the ware cannot be handled with safety. Soft, when the ware is firm, but may be handled with care, and may be bent. Green, when the ware is still moist, but will crack under pressure. Hard green, when the ware has become harder. Dry, when the ware powders by scraping. All decorations on the clay are done in the green state.

Scraffito decoration may be applied to either built, thrown or cast pieces. The principle is that of two layers of different colours, or rather a coating of slip on a ground of clay. The upper layer is scratched or cut

FIG. 82.—1, Seger Cones before and after firing; 2, Props and Stilts; 3, Tiles and Plates propped for firing; 4, Vase in position on Stilt; 5, Old Salt Glaze Sagger; 6, Spouted Vessel for pouring Slip; 7, Backs of Tiles showing "Cut-outs"; 8, Encaustic Tiles (Mediæval).

through with various tools to the lower layer, which forms the ground of the pattern. This layer may be achieved in three different ways—firstly, by means of the brush and sponge, a thick coating of slip being laid on with a brush and dabbed with a fine sponge; secondly, by dipping, which explains itself; thirdly, by spraying.

A piece may, however, be cast in two different coloured slips of the same consistency, the inner and darker coat, possibly, a little thicker, the process being the same as for casting ordinary ware.

The tools used are fine modelling tools, the eye of a small darning needle with the end rubbed down on an oilstone being used for outlines.

There is a method called "Cloisonné," also much practised at the present time, in which the outlines of the pattern are in slip and therefore raised, forming cloisons, into which are introduced various coloured glazes.

All ware must be dried thoroughly in the drying cupboard before firing; it must be examined before placing into the kiln and any cracks stopped. If a piece cracks from the edge it is useless. A crack is cut *completely out* and a piece of stiff clay introduced into the cavity and worked smooth.

The placing or stacking of the ware in the kiln is an important matter, though it only becomes complicated in the case of large kilns. Further, the stacking of a "biscuit" oven is a simpler matter than that of "glost" or glazed, since clay pieces may be allowed to touch each other, or may upon occasion be placed inside of one another if dry powdered flint is sprinkled in the larger piece to prevent the two sticking together.

Fireclay bats and props are used to form a series of shelves in the kiln according to its size; by this means the kiln may be filled with ware, the lowest section being filled first, a propped bat being placed over the ware and the next section filled, and so on.

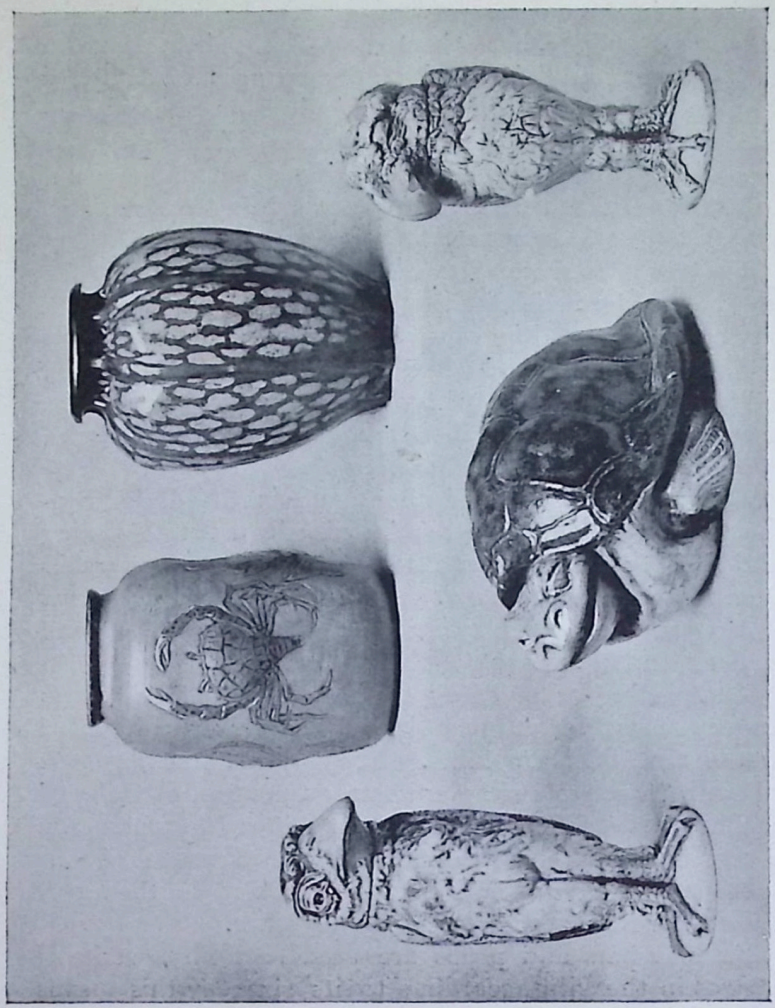


FIG. 83.—Martin Ware.

The biscuit kiln is fired (for earthenware) to 1110° C., cone 02 ; for china or English porcelain to 1270°, cone 7.

It is necessary for the operator to have some means of determining the temperature during firing. The Seger test cones (Fig. 82) (1), are made from materials having a definite melting-point. Two or three should be used representing different temperatures. They are placed slightly at an angle so that they will all fall one way. Their numbers must be in evidence, and they must be placed in such a position that they may be seen through the peep-hole, not too near the door.

After the ware has been fired in the biscuit oven it is glazed and passed through the glost oven.

Glazes may be either transparent or opaque, "matt" or glossy; a great variety is supplied by the different makers suitable to various bodies and temperatures.

The readiest method of glazing is by means of dipping; the ware being porous in its biscuit state, it absorbs the water, leaving the glaze deposited on its surface.

Ware may, however, be glazed by spraying with an atomizer, and for certain kinds of work this method is preferable; or it may be applied by means of a brush or sponge.

There is also the method of glazing by means of common salt, shovelled into the oven when the heat is at its highest, the ware being placed in saggers having perforations round the sides to allow the fumes of the salt to reach the ware (Fig. 82) (5). The soda is decomposed under the action of the vapours by the silica in the body (usually a stoneware), forming a soda-silicate. The glaze is deposited in minute granulations somewhat resembling the skin of an orange. It is an old method, having been practised in Germany early in the sixteenth century; in Staffordshire during the eighteenth, and is in use at the present time. The group of "Martin" ware illustrated is salt glazed, this being the usual method of the Brothers Martin (Fig. 83).

The setting of a "glost" oven is a much more delicate matter than that of "biscuit," obviously, since the glaze being fusible in the oven, the pieces would adhere to any surface they are placed in contact with. To obviate this a number of props, stilts, spurs, thimbles, saddles, &c., are devised, most of them having points on which the ware rests, and so diminishing the injury or loss (Fig. 82) (2).

Flat-bottomed pieces are placed on stilts having three points (4), chosen according to the size of the piece. For plates, dishes, &c., thimbles are used fitting into each other, forming tiers (2, 3), saddles being used for the heavier pieces.

In the case of a small kiln, the matter of setting is comparatively simple; in the cases of large kilns the difficulty is enormously increased and the setting must be done with the greatest possible care.

The temperature of the kiln varies at its different parts, the hottest place being usually in the centre; it is always cooler near the door; moreover, the length of time required for firing varies according to the state of the atmosphere.

The glost oven is fired to 1050° C., cone 05.

All kilns and ovens must be allowed to cool thoroughly before being drawn. Careful potters keep a record of the firing: the length of time, the results, &c.

PAINTING UNDERGLAZE.

Even the most cursory study of the older forms of pottery, either Italian Majolica, Hispano-Moresque, or Oriental, will reveal one great outstanding fact, viz., that the colour palette for painting was essentially a restricted one—that certain colours largely predominate over others, and that the effects obtained are for the most part simple.

The colours used in the decoration of pottery are preparations of various metallic oxides that fuse with the clays at certain temperatures. It is found that this fusing on certain bodies and under certain conditions produces effects that no other material gives, and is characteristic

of the particular material and method of pottery, and it is this peculiar quality which should be the aim of the student to preserve. Of these colours blue (oxide of cobalt) is by far the most important, and forms the base or foundation of most of the colour arrangements of old pottery. It is used by itself as in Ming and other Chinese porcelain, Delft earthenware, Rouen ware, &c., and it is used in conjunction with other colours, as in Italian and other Majolica, Persian and Damascus ware, &c. In these latter, in addition to the blue there is a fine orange, a yellow, several turquoises or copper greens, manganese, and a red.

The technique of underglaze painting is comparatively simple, quite simple in fact, the main thing needful being a knowledge of how the colours behave under the action of the fire. Most colours weaken—*i.e.*, fire away to a certain extent ; others, as cobalt and manganese, are much stronger when fired than they appear when applied to the ware. Again, the hues change materially under the action of the fire, the cobalt blue being quite a dull mauve before it is burnt. It is therefore absolutely necessary, before doing any serious work, to make a test tile or plate with a specimen of each colour gradated. When this is glazed and fired the relative strength of each colour will be apparent.

Most earthenware bodies are soft and porous. It is necessary therefore for painting purposes to render the surface non-porous by means of a thin coat of gum tragacanth, laid on with a broad brush. It is easy to test the porosity by touching the pieces with the tongue.

Two different mediums are used in pottery painting, either under or over-glaze—water, with a little gum to make the colours adhere and to make them work well, and oil, *i.e.*, turpentine, with fat oil to take the place of the gum of the water medium. Fat oil is supplied ready made, but one can make it oneself by simply filling a small vessel, say an eggcup or teacup placed in a saucer with

Fig. 81.—Glazed Earthenware Figures, by Mrs. Harold Stabler.

turpentine, and keeping it for painting purposes; the oil from the turpentine will ooze over the side of the cup and gradually fill the saucer; or one may make it very readily by adding some resin to turpentine and placing it in a warm situation for a short time, though the quality is not so good.

The design is drawn on the ware with pencil or charcoal, or it is transferred by means of transfer paper, or pounced, and the painting proceeded with. Some beginners prefer the oil method, by which they are better able to gauge the strength or thickness of the colour applied, colours mixed with water looking dry and opaque, though there can be no doubt that more freedom is possible with water.

The third, and probably the best course, is to commence with water and finish with oil, which latter does not disturb the under-painting.

The colours must in every instance be well mixed or ground with a palette knife. In the case of the oil medium, if colour be left on the palette to be used on another occasion it should be covered with a saucer to keep it free from dust.

If a perfectly flat tint of colour be desired, flat brushes or dabbers are made, set in a wooden handle, and obtained from any artist's colourman.

When the painting is completed it is glazed and sent through the glost oven, and fired to a heat of 1050° C., cone 05; but before glazing, if oil be used in the painting it must be burnt out by a firing in the enamel kiln, or a kiln at something like enamel heat, otherwise the oil would prevent the absorption of the glaze by the colour.

The glazing is usually done by means of "dipping," the glaze being mixed with water and placed in a tub or vessel large enough to admit any piece required to be dipped.

There is, however, another method, not usually practised, since it is scarcely feasible in large manufactories with a considerable output, but which offers some advantages to the individual artist working on a limited scale. This is to apply the glaze with a *brush*, using turpentine as a

A B C

FIG. 85.—Lustre Vases, the Pilkington Tile and Pottery Co.
A. Silver Lustre on white ground, designed by W. S. Mycock. B. Silver and Ruby Lustre, designed by Richard Joyce. C. Silver and Ruby Lustre, designed by G. M. Forsyth.

medium instead of water, in which case the painting would be better done in water, which would not be disturbed by the glazed mixed with turpentine. A painting in the oil medium might be glazed in this manner provided sufficient dexterity be used.

The advantage of this method lies in the fact that the glaze may be more freely applied to those parts requiring it—*i.e.*, loaded on to the strong cobalt blue, and applied thinly to the delicate parts as the flesh of figures. Everything depends upon the effects one goes for, and the decorative method one adopts; if the whole piece is, for example, outlined in blue (a very excellent method and that of much of the Italian majolica), oil glazing would not be necessary, in fact not desirable, as an even quantity of glaze would be required all over the piece; but if the outline were, say, in brown, with strong blue patches at intervals, the oil method would offer very distinct advantages.

The technique of overglaze painting is at once simpler and more difficult than that of underglaze; simpler, because the colours are brought nearer to their final tint by "fritting"—*i.e.*, the addition of certain glassy fluxes to enable them to fire at lower heat; and more difficult, firstly, on account of the glazed surface to be worked upon, and, secondly, from the fact that more delicate and more complex effects are usually arrived at. But even the technique of overglaze may be kept within comparatively simple bounds, the degree of difficulty again depending upon the character of the work aimed at. For example, the technical difficulties offered by a Boucher subject on a Sèvres vase are considerable; on the other hand, the technique of the painter Lessore, who produced such interesting work for the Wedgwoods during the 'sixties of the last century, is perfectly simple, its qualities being artistic rather than technical.

Enamel or overglaze colours may for painting purposes be divided into three classes: 1. Affinity colours, which are

capable of being mixed with each other, and which include those valued colours prepared with gold, of which Purple of Cassius is the base, as Rubies, Crimsons, Purples, Roses Dubarry. 2. Colours made from copper bases, as turquoises and some greens. 3. Those reds which are preparations of oxides of iron. The two last-named classes must be used by themselves and are not capable of being mixed with each other nor, broadly speaking, with the affinity colours. One would not mix, for instance, a turquoise with an iron red, if one did, the fired result would be peculiar.

The mediums are several: Turpentine with fat oil; oil of tar; spike lavender oil, the latter having the effect of keeping the colour "open" during the working—*i.e.*, preventing a too-rapid drying while laying an even tint. Oil of aniseed is also used for this purpose.

Some of the stronger colours may, however, be mixed in water (with gum) and oils used on top. Very excellent results have been produced by this means.

For the laying of flat tints the flat dabber referred to earlier in this chapter is practically indispensable. Flat oil sable brushes are of the most service, and occasionally round sables are used. The necessity for keeping the mixed colours free from dust is greater in overglaze painting than in underglaze.

Enamel colours, as in the case of underglaze, are affected in various ways by the action of the fire; some fire away more than others; some, especially rose colours, change in hue more than others. These latter from their sensitiveness to the action of heat are used for testing the firing—*i.e.*, one or two small pieces of ware having a little colour rubbed on with the finger are placed in the kiln, to be drawn out at intervals. If under-fired the colour is a brick red; if fired to its proper heat, it is the colour of Rose Madder; if *over*-fired it is a dull grey purple, becoming duller according to the degree of heat. The

Enamel kiln is fired to a heat varying from 860° C. (Regular kiln) to 920° C. (Hard kiln), cones 013 and 011.

For setting out or tracing the design on the ware India ink is used, applied with a small water-colour brush. This fires away in the kiln.

It would serve no purpose to draw any invidious comparisons between the under and the over-glaze methods, they are simply different in their character, for while no enamel colours can compare in richness and depth, or in beauty of glazed surface to the underglaze, with sufficient knowledge and skill the two methods may be associated with excellent results as was done by the Chinese, who took advantage of the splendid quality of the underglaze blue and indeed other colours, and either introduced panels in enamel, or superimposed enamel colours on top. Further, speaking broadly, the more delicate material of porcelain would appear to call for the more delicate method of enamel; moreover, enamel colours are most useful for patching up faulty passages without necessitating the piece being again passed through the higher heat of the glost oven.

LUSTRE.

This is a far too extended subject to be dealt with at all adequately here; it may, however, be stated that the old Staffordshire lustres were not true lustres, their surface was metallic with little or no iridescence.

The first true lustre produced in England is that of William de Morgan, who commenced to experiment about 1869–70. He described his process in a lecture delivered before the Society of Arts in 1892 :—

"The pigment consists simply of white clay, mixed with copper-scale or oxide of silver, in proportions varying according to the strength of colour we desire to get. It is painted on the already fused glaze with water and enough gum arabic to harden it for handling and

FIG. 86.—Lustre Bottle (Victoria and Albert Museum), by William De Morgan.

make it work easily. . . . The ware, when painted, is packed in a close muffle, which is then raised to a very low red heat, so low, when the ordinary tin enamels are employed, as to be only just visible. A charge of dry wood, sawdust, wood chips, or, indeed, any combustible free from sulphur, is then introduced into the muffle through an opening level with the floor, a space having been left clear under the ware for its reception. As soon as it has blazed well up, the opening is closed. The flare then chokes down, and the combustion of the charge is retarded, the atmosphere in the muffle consisting entirely of reducing smoke." (See Figs. 85 and 86.)

Messrs. Wenger supply a set of six samples of metallic lustres of different shades at the price of 10s. These fire in the usual kiln at a heat of 860° C.

Water is the medium. Pieces may either be painted entirely in lustre or it may be introduced as an adjunct to painted work.

The gold used on pottery is the pure chloride precipitated to a powder and mixed with silver and a flux. It is applied with the brush in the same way as the colours, with turpentine and fat oil as medium. It fires at 860° C. and comes out dull; it is afterwards burnished, first with fine sand and then with an agate burnisher.

Liquid gold sold in bottles is properly a lustre. It fires at 860° C. It does not require burnishing. It has no lasting properties—*i.e.*, it easily wears off.

The firing is necessarily one of the most important operations in connection with the production of pottery. Kilns are supplied by Messrs. Fletcher, Russel & Co., Ltd., 134, Queen Victoria Street, London, E.C., or they may be obtained from Messrs. Wenger, Etruria, Stoke-on-Trent, who act as agents to the last-mentioned firm. The fuel is gas.

In designing for pottery, as indeed in all other crafts, the character of the material is the first consideration;

the handles of jugs, vases, &c., must not suggest those of metal, since what is possible in the one material is impracticable in the other; moreover, the purpose of an article should determine the character of its ornamentation.

In the case of objects having rounded contours the principal decoration is planned on that part of the object most readily seen.

Designs may be made on paper, setting out the spaces to be decorated, and afterwards transferred to the ware by means of tracing and black transfer paper, or the decoration may be drawn direct on the piece, either in pencil or charcoal in the case of under-glaze, or India ink for over-glaze work.

For further technical information on this important subject the reader is referred to "Studio Pottery," by Frederick H. Rhead, a most admirable handbook issued by the People's University Press, University City, St. Louis, Mo., giving a clear and concise account of the composition of bodies and glazes, with the method of working, and explaining all the principal devices adopted by modern potters. For a complete exposition of true lustres, Mr. William Burton's lecture before the Royal Society of Arts may be cited (*Journal of the Society of Arts*, June 7, 1907).

FIG. 87.—Majolica Dish, by the Author.

Alfred the Great. Columbus.

FIG. 88.—Cartoons for Stained Glass, by Ford Madox Brown. (By the Courtesy of Charles Rowley, Esq.)

CHAPTER VI.

STAINED GLASS.

It is to be understood that stained glass is a mosaic of pieces of different coloured glass, held together by strips of lead, which in their turn are strengthened at intervals of from 18 inches to 2 feet by iron bars fixed in the masonry; that all colour effects in a window are produced by the different coloured glasses, and that the only pigment used is a dark brown, employed for the shading or modelling of all parts of a window—in other words, if a piece of drapery be blue, a piece of blue glass is used; any shading, modelling, or variety of tone is produced by this same brown pigment, the same rule holding good for each different colour, this pigment being burnt on in the kiln (necessarily at a lower temperature than would melt the glass) and rendered absolutely permanent. It follows, therefore, that each different colour must of necessity be bounded by a lead. If a particular colour or portion of drapery, or what not, be too large for the purpose of firing, or if the shape be such as cannot be conveniently cut, it is broken up or subdivided by cross-leading.

Coloured glass is of two kinds. The first, called "pot metal," is coloured throughout the thickness of the glass, the second being coloured merely upon the surface by means of flashing. This flash may be lightened or removed, or a certain degree of modelling or variation of tone produced by the application of fluoric acid. The process of the earlier painters was the more laborious one of polishing through the stain.

For the flesh of figures, white glass, known as Cathedral glass, is invariably used, the brown pigment producing the modelling or shading. Flesh-coloured glass (pot metal) is, however, occasionally used, though rarely for ecclesiastical glass.

Further, various stains of yellow (a preparation of silver) are used for diapered patterns, the turn-overs of drapery, hair and other parts, serving as a further enrichment. These are applied to the back of the glass.

Stained glass began by the method known as "plain glazing," in which different coloured glasses were leaded together so as to form a pattern, without the addition of painting which was afterwards introduced, first in the form of rosettes and other devices, and then applied to the whole window. Plain glazing has received considerable development during recent years, many admirable effects being produced by the use of the modern "figured" or streaked and opalescent glasses (Fig. 92).

Grisaille is a method of painting or tracing in the brown pigment and staining parts in the different tones of yellow or orange. It was much practised by the early glass painters; it may be used either by itself for small windows, or for larger windows in conjunction with coloured glass, chiefly in what is known as quarry work. (See illustrations of window light by Sir Edward Burne-Jones; in this instance colour is introduced in the circular border—Fig. 94.) Subjects may be treated with as much delicacy as is desired, and there are no considerations of leading except the dividing up of the glass into sizes practicable for firing.

The first thing for a designer to do is to prepare a small colour sketch to scale, usually 1 inch to the foot, or for very large windows 2 inches. In this the chief consideration is the general arrangement of the composition, the effect of colour masses or spaces, the leading and cross-leading, and the disposition of the iron bars, it being

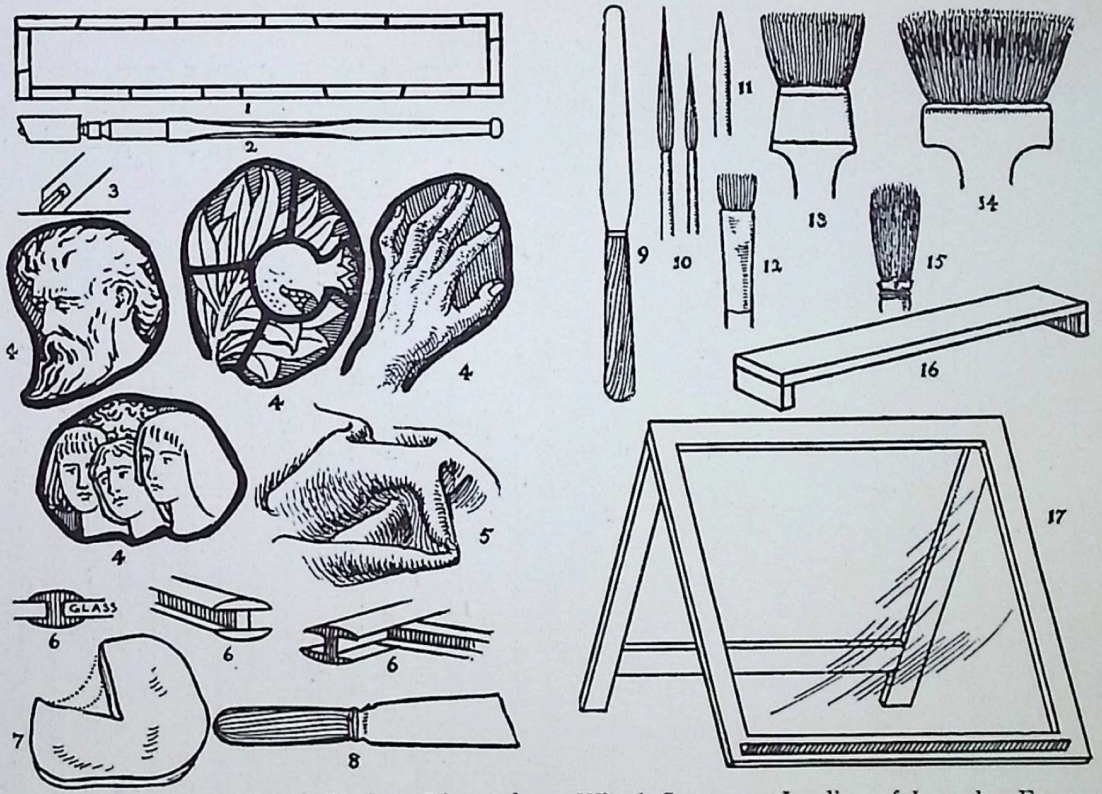


FIG. 89.—1, White Line; 2, Glazier's Diamond; 3, Wheel Cutter; 4, Leading of Irregular Forms; 5, Foldings of Drapery; 6, Leads, showing Core and Joint; 7, Glass, showing angle impossible to cut; 8, Glazier's Knife; 9, Palette Knife; 10, Riggers; 11, Point for taking out Lights; 12, Scrub; 13, 14, 15, Brushes for Laying "Matts"; 16, Hand Rest; 17, Table Easel.

readily understood that these bars should not come across important parts as faces, hands and feet. In windows placed high, a little allowance should be made for the projection of the bar, which should be placed a little lower than would be necessary if seen from a level point, otherwise in the cases of thick bars a portion of a face may be cut off, or may unpleasantly impinge upon a bar. This, however, is a consideration for the cartoon rather than for the sketch—*i.e.*, a face, or what not, should be placed a little higher than the marked bar line.

It has been found by experience that the effect of a window is much enhanced by detaching the design from the stone or wood work by means of what is called a "white line" or narrow border of white glass, the width of which necessarily varies according to the size of the window, from a quarter of an inch to 1 inch. This is, of course, cross-leaded at intervals of from 2 to 4 inches according to its width, and pleasantly varied in the lengths and even the direction of the lines, so as to avoid a mechanical effect (Fig. 89) (1).

The general effect of the window being settled in the sketch, a full-sized finished cartoon is made on cartoon paper, in either charcoal (in some respects the best method), soft pencil, or wash, bistre being the colour usually employed. This will supply all the details of the window as well as the precise shapes of the various pieces of glass, together with the leading, only such shapes being drawn as may easily be cut in glass, remembering that we are dealing with a brittle substance to be cut with a glazier's diamond, or wheel, the latter an American tool sold for 1s., in some respects preferable to the diamond since the rough surface of antique glass has a deleterious effect on the last-named tool, while the wheel may be sharpened on an ordinary oil-stone (Fig. 89) (2, 3).

It will be obvious that all measurements of a window should be set out exactly, a template of the light being

obtained, since the cartoon provides the guide for both cutting and painting, the glass being often placed on the cartoon for these purposes; this exact setting out, together with the white line and the precise position of the bars, being the first thing to be done. The design is now sketched lightly in, the lead lines being drawn as soon as practicable, since it is on these that much of the effect of the window will depend. It has already been stated that the shapes of the individual pieces of glass should be as simple as possible for the convenience of cutting; they should never, even in the case of large windows, exceed 8 or 9 inches, as the firing also has to be considered. In the case of profiles of faces, of hands, or of forms with a serrated or otherwise broken contour, the leads assume only the general shape of the form, the spaces being filled in with the brown paint, which will tell as black, and if these forms are arranged to come on a background of any of the darker coloured glasses, this filling in will scarcely be appreciable. The illustrations given (Fig. 89) (4) will doubtless make this point clear, better than any written description.

In a composition of a number of small figures, several heads may be so disposed as to be leaded in one piece. In a word, good leading, one of the most important considerations of a glass window, is a matter of experience and judgment. If, for example, a hand is to come on a light background, one does not arrange it with the fingers spread out as in the illustration given, otherwise the filling in becomes grotesque. One rather arranges it in as pleasant a form as it may be practicably leaded. Further, any projections or points of a form must be tied with cross leads at those projections.

Properly treated, the leading is of the greatest possible assistance to the glass designer. The principal lines of a drapery may be emphasised by this means, making the cross-leading a comparatively simple matter. There is,

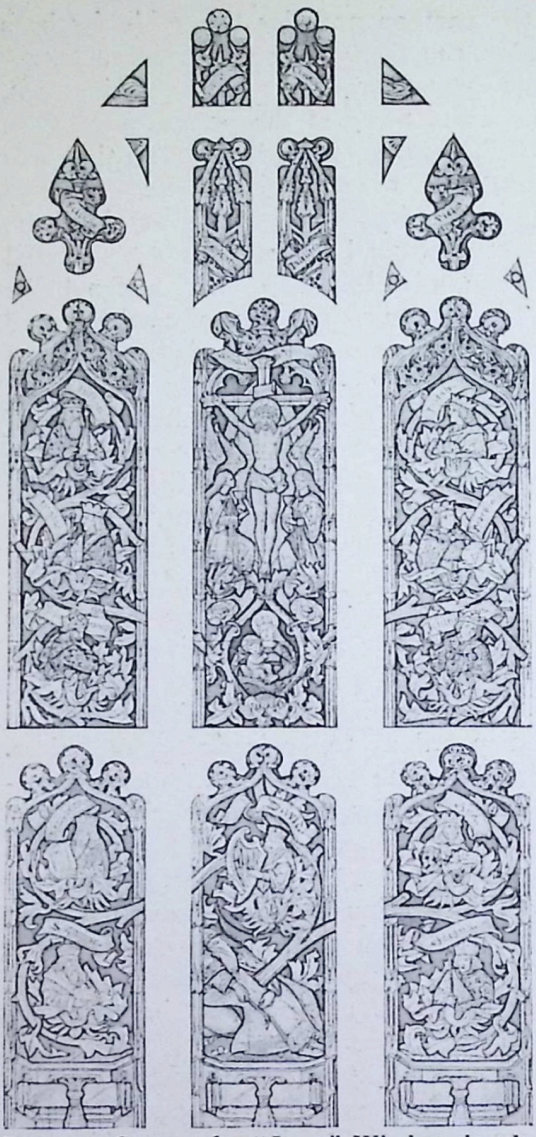


FIG. 90.—Cartoon for "Jesse" Window, by the Author, from the Sketch of J. C. Powell.

moreover, no rule as to this cross-leading except the convenience of the cutter and decorative effect of the leads. Some artists prefer the more severe treatment imparted by the predominance of horizontal lines, others prefer a more varied arrangement. Some prefer a heavily leaded window—*i.e.*, the spaces much broken up by the leads, and even using different thicknesses of lead, and it is possible to obtain great richness of effect by this means; it is mainly a

matter of individual taste and preference.

In the treatment of drapery, effective use is always made of the *turnovers* of the folds and any portions which show the under side of the garment, as, for instance, the sleeves. These are usually stained with the yellow stain. Moreover, the under side of a robe will provide an opportunity for the introduction of a different colour to that of the upper.

The ornamental patterning of drapery, also, forms an important feature of stained glass, the richness of a window being greatly enhanced thereby.

This may be effected in three ways—1, by

FIG. 91.—Window at St. Michael's Church, Bedford Park, by J. H. M. Bonnor.

simply tracing the pattern over the folds in the brown paint; 2, by tracing and afterwards eating out the pattern, or ground, or parts of the pattern by means of acid; 3, by introducing a different coloured glass to that of the ground work of the drapery, which colour must of course be leaded round. This latter is obviously only suitable for the larger or more heavily diapered patterns. A purple robe, for instance, may have inlets of ruby, which may be also subjected to aciding, and an extremely rich effect produced.

Simple arrangements of drapery, doubtless, are more suitable for patterning than more elaborate ones, or those long continuous pipey arrangements to be found in early glass. In drawing the pattern upon the folds, the lines of the former will necessarily follow the contour of the folds, the pattern being broken in those parts where several folds come together, thus producing a natural effect.

Borders to robes are usually of a different colour to that of the field, and are therefore leaded round; more often they are of white glass, the pattern traced and afterwards heightened by the yellow stain.

The stain is also used for the decoration of the nimbi of saints, which are usually of white glass; these, by the way, are always better drawn freehand rather than struck by the compass, which gives them a mechanical appearance, this on the same principle that a drawn letter is better than a printed one. Some artists go so far as to make the nimbi frankly elliptical in form.

Another important consideration is the proportion of figures—there can be no possible doubt that tall figures with small extremities make for "style," and that short, stumpy figures look mean. Eight heads is a good rule, measuring from the chin to the top of the head, including the hair. Raphael, however, rarely exceeded $7\frac{1}{2}$ in his paintings; Burne-Jones, for glass, sometimes gives as many as $9\frac{1}{2}$ and even 10. The latter number, however,

may be said to be excessive, and only possible for certain classes of work.

THE CUT LINE.

We now assume that the cartoon is complete in every detail. The next step is to make the "cut line," which is the pattern of the leading alone, by means of which the pieces of glass are cut. This is made upon transparent tracing cloth pinned over the cartoon with the dull surface uppermost, the lines being traced upon the cloth with lamp black, about one-eighth of an inch thick, representing the thickness of the core of the lead, the middle of the lead line being followed in the tracing.

A very usual method of cutting, for the lighter coloured glasses, is to place the glass over the "cut line," which will show through the glass, remembering that the pieces of glass do not meet each other in a window, but are divided by the core of the lead, as shown in the illustration (Fig. 89) (6). For the darker glasses, as blue and ruby, this method of cutting is not possible, and for these a template is made of cartoon or thick cartridge paper of each shape to be cut. This is readily done by placing the tracing cloth "cut line" over a piece of cartoon paper and transferring the lines by the pressure of a pointed instrument, as a piece of wood or hard lead pencil, allowing in the template from one-sixteenth to one-eighth of an inch for the core of the lead. The template is easily cut upon a sheet of ordinary glass, using a sharp penknife.

A piece of window glass has a right and a wrong side, the right showing little spots, streaks, &c. This is the side for cutting as well as painting upon. The most practicable shapes to cut are gentle undulating curves; a sharp angle cut into the glass is impossible, as the glass would snap across, the possible curves being shown by the dotted lines in the illustration (Fig. 89) (7). The tool is held between the first and second fingers, with just sufficient

FIG. 92.—Design for Plain Glazing, by Guy Miller.

FIG. 93.—Cartoon for Leaded Light, by J. F. Hogan.

pressure to bite the glass, which is afterwards broken, if it be a curved line, by means of tapping the under side of the glass with the tool, following the "cut line." For acute curves it is necessary to break away the glass piece by piece with pliers. For straight lines the glass may be broken by the fingers.

The cut should be continuous, and if it be a good one the line will be scarcely perceptible. If, on the other hand, it scratches and throws up minute pieces of glass on either side, the pressure is too great. A certain amount of waste is almost inevitable until the operator has become familiar with the cutting tool.

PAINTING.

We are now ready for painting. This consists of two processes—the tracing or outline, done with a long pointed brush called a rigger (Fig. 89) (10), and the *matting* or shading. Water is the medium, the brown pigment being mixed with a little gum arabic, sugar, or treacle, to make the colour work well and to make it adhere to the glass. Tracing brown is reddish in hue, and is rendered cooler when required by the addition of a little black, the last-named pigment being used for the cooler shadows, or for filling in wherever a strong piece of black is required. The convenience of a hand-rest (see Fig. 89) (16) will be obvious; it takes the place of the mahl stick in picture painting.

Most of the tracing may be done by placing the pieces of glass over the cartoon and tracing through, but it will be obvious that for the darker glasses and for finishing it is necessary to set up the glass against the light. Corrections may be made with a pointed stick, and the strength of the lines may be reduced by scratching through with a needle fixed in a handle.

For the more complicated process of *matting*, a glass

easel is necessary. This is formed of a sheet of plate or thick window glass fixed in a deal frame with supports to keep it at the required angle, and a ridge along the lower

FIG. 94.—Leaded Light, by Sir Edward Burne-Jones (Victoria and Albert Museum).

edge, upon which loose pieces of glass may be placed for painting (Fig. 89) (17).

The frame is placed flat upon the table, and the different pieces of glass placed in position as they would be seen in the completed window, but, of course, *without* the leading. The pieces are fixed to the glass sheet by means of melted beeswax placed at each corner on the under side of the

pieces; the frame is then set up against the light and the painting proceeded with.

For the laying of a "matt" or tint, a process requiring

FIG. 95.—"The Song of Songs": Cartoon for Stained Glass, by Sir Edward Burne-Jones, in the Possession of C. Fairfax Murray, Esq.

some dexterity, especially if it be laid upon an *unfired* outline, a broad camel-hair brush (Fig. 89) (13) is used filled with colour (water being again the medium), passed lightly over the surface in even strokes, which must not if possible overlap. The "matt" is then manipulated and rendered smooth, or otherwise, by means of a soft "badger" (14). When dry almost any gradation of tint may be produced

by means of scrubbing out lights with "scrubs"—*i.e.*, worn hog-hair brushes (12), or by scratching with a needle, or by any means that the worker chooses; it is simply a question of getting the colour on the glass and manipulating it in an interesting manner.

The glass is then fired in the kiln, and when any strong effects of light and shade are required a second painting and consequently a second firing is necessary.

Glass kilns with gas fittings are supplied by Messrs. Fletcher, Russel & Co., Ltd., 134, Queen Victoria Street, London, E.C., the prices ranging from £4 upwards according to size, the firm supplying full directions and demonstrations for working, *absolutely necessary to the beginner.*

The firing is tested by means of an iron rod introduced into the kiln and placed near the glass. If a gloss appears on the pigment and reflects the rod, the colour is fused sufficiently. The yellow stain is fired separately, at a lower heat.

LEADING UP.

After all the various pieces of glass are cut, the important process of "leading up" is proceeded with. The "cut line" is now pinned down upon a bench or work table, a couple of straight edges placed along the base and right side of the panel or light, fixed to the bench and forming a true right angle. The outside lead of the panel, usually thicker than the rest, is adjusted first, the leads having been pulled straight by means of a pair of pliers held at one end, the other held underneath the foot, taking care that the core is not twisted in pulling, the ridges of the lead being then opened by means of a blunt skewer, the lead being cut to the required size, using a sharp thin knife, the cut being vertical.

Commence from the corner and continue till the limit of the panel is reached, driving in thin nails at intervals close up to the leads to keep these and the glass in position. Afterwards place two other straight edges along the two other sides of the panel, pinning them down, and the

panel is then ready for soldering. This latter is the usual glazier's process. The soldering iron is heated, and "tinned" by rubbing on a piece of iron with a little solder, resin and glass dust until the head has a tinned face. A drop of solder is melted off at each joint, spread evenly with the tool, and the panel turned over and the process repeated on the reverse side.

It will be found after soldering that the glass is loose in the leads and that the panel is not rigid. This is remedied, and the panel made watertight by means of a cement run into all the grooves, composed of two parts whitening and one part plaster of Paris, made into a thick paste by the addition of boiled linseed oil and turpentine in equal parts, with a little red lead to make it harder, and some dryers. The mixture is well scrubbed into the leads with a hard brush, and the whole is coloured with lamp black.

Large windows are leaded in sections for convenience, and fixed together afterwards. The "lights" are attached to the iron cross bars by means of copper wires about 3 inches long, soldered vertically at any convenient joint, and tied round the bar by means of pliers.

There still remains to be explained the process of aciding. The different colours of stained glass, as previously explained, are produced by a process of "flashing" upon the surface during manufacture. This flashing may be eaten through to the white glass beneath by means of fluoric acid. The process is to stop out the pattern, or the background of the pattern as the case may be, with Brunswick black, which resists the acid. The back and edges of the glass are then painted over, in fact all portions of the glass except that intended for the acid to attack. It is then placed in a leaden bath containing one part acid and two parts water. The glass is afterwards well rinsed in water, and the Brunswick black cleaned off with turpentine. The acid is dangerous, and care must be taken to prevent its getting upon the hands or clothes.

CHAPTER VII.

METAL WORK AND JEWELLERY.

METAL covers a vast field, and has formed one of the most important branches of the applied arts since the days of Tubal Cain.

All metals for decorative purposes are purchased in the form of cast bars or ingots, obtained from their respective ores by means of smelting; from these ingots, sheet, tubes and wire are produced, these forming the materials for the worker, the two last being both round and square, flat and moulded.

There are two principal considerations in the working of metal—firstly, its alteration in shape from the condition in which it is obtained from the dealer; secondly, the methods of attaching or welding pieces together so as to form a complete work.

There are two principal methods of dealing with, or working metal—casting, and beating or hammering (Repoussé).

There are two principal methods of casting—(1) by what is known as the "waste-wax" process; (2) by means of a mould of exceedingly fine sand, which, subjected to pressure, becomes firm and cohesive, so that the surface is not disturbed by the molten metal poured out of the crucible.

The model from which the mould is taken may be either of plaster, wood or other sufficiently hard material, and is made slightly larger than is required in the finished work, to allow for a certain amount of shrinkage of the metal during cooling.

There are two kinds of moulding—simple moulding, in which the mould is in two parts, and piece moulding, in which it is composed of several or many parts, the latter being much the longer process and consequently more costly.

Simple moulding—*i.e.*, for objects having no undercutting—is soon explained. It is done by means of a pair of iron casting flasks or boxes about 3 inches in depth, fitting into each other by means of flanges and pegs, with holes and air channels at the ends (Fig. 96) (1). The two sides are filled with sand, well beaten down with a mallet, the two surfaces dusted over with fine brickdust to prevent them sticking together. The model, brushed over with blacklead, is placed between, and the two sides pressed firmly together, forming a matrix into which the metal may be poured.

Very small castings with no undercutting, for jewellery, may be done in cuttle-fish bone cut in half, the two faces rubbed smooth and three register pegs inserted and then pressed closely together (Fig. 96) (2). The model and pattern is placed midway between the pegs, the two halves pressed closely together forming the matrix. A channel is made from the hollow mould to the outside of the bone for pouring in the metal, also four or five small channels radiating from the centre for air holes. The two pieces forming the mould are bound tightly together, the metal with a little borax is melted with a blow-pipe in a pit or cavity made in a charcoal block and poured in.

For piece moulding the model is placed in the lower portion of the casting flask set on a board and filled with sand, a hollow being made for its reception; the sides of the model are then well supported or filled in by more sand. The seams or divisions of the model must be so arranged as to avoid any undercutting; the different faces of the model are thus moulded separately. The vents and the pour are then made, and if the casting is to be solid, the mould is ready for the metal to be poured in. For

hollow castings, however, a core made of baked sand is necessary.

The "lost-wax" process for large work is far too complicated to be entered into here. Briefly the process is as

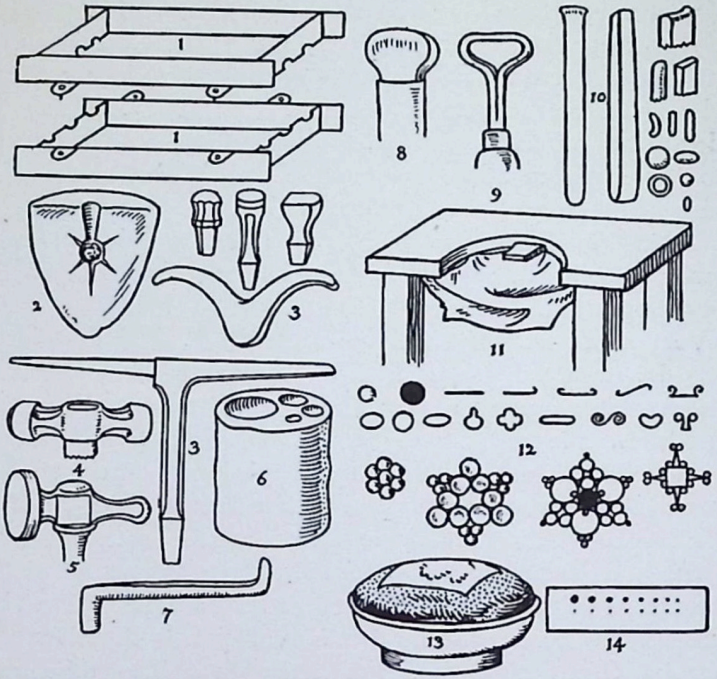


FIG. 96.—1, Casting Flasks; 2, Cuttle-Fish Bone; 3, Stakes for Raising; 4, Raising Hammer; 5, Repoussé Hammer; 6, Sinking Block; 7, Snarling-Iron; 8, 9, Burnishers; 10, Punches; 11, Jeweller's Bench; 12, Grain and Wire Units and their Application; 13, Pitch Block; 14, Wire Gauge.

follows:—A hollow model is made of wax of the thickness intended for the metal, and is moulded in one piece both inside and outside. The wax is withdrawn by melting out; the metal is then poured into the cavity.

For small objects the principle is the same as for large;

the process, however, is much simpler, since the model is solid and the casting solid.

There is also a method of casting hollow objects in the waste-wax process by means of a gelatine mould, forming a matrix into which melted wax is painted with an even coat of the thickness of one eighth of an inch. When cold, the wax is removed from the matrix, giving a hollow casting in wax. A rod of wax for the *pour* is placed at the back of the model and a stout iron wire to carry the core is run lengthwise through the model. The wax is coated with sand and the mould bedded in the flasks, the wax melted out and the object then cast, the core being subsequently removed piece by piece.

The work of the smith, in black, white, red or yellow metal, consists of beating out or bending on a rigid surface (anvil or stake) these various substances into shapes. The beauty of a piece of hammered work depends—1. Upon its general form. 2. The character of its ornamentation. 3. Its surface. Different metals call for different treatment on account of the different uses to which they are put,—their difference of scale, texture or surface. A gold cup would be treated differently to a brass jardinière.

Hammered work for shapes (raising) is done on stakes of various shapes and sizes, usually held in a vice, and occasionally fitted into a block of wood or stone, standing on the floor (Fig. 96) (3). As a matter of fact, any iron object of clean and smooth surface and of suitable shape will do to hammer on, as a kitchen poker, a flat-iron, and for small work the heads of hammers.

The vice should be sufficiently heavy to prevent vibration—*i.e.*, from 70 to 90 lbs., with jaws about 5 inches in width. The hammer is of the shape given in the illustration (Fig. 96) (4), one face flat and the other rounded. Its size depends upon the character of the work; one with a face three-eighths of an inch thick is used for cups and similar objects, and a smaller one occasionally.

FIG. 97.—Cross and Candlesticks in Steel, by Ernest W. Gimson.

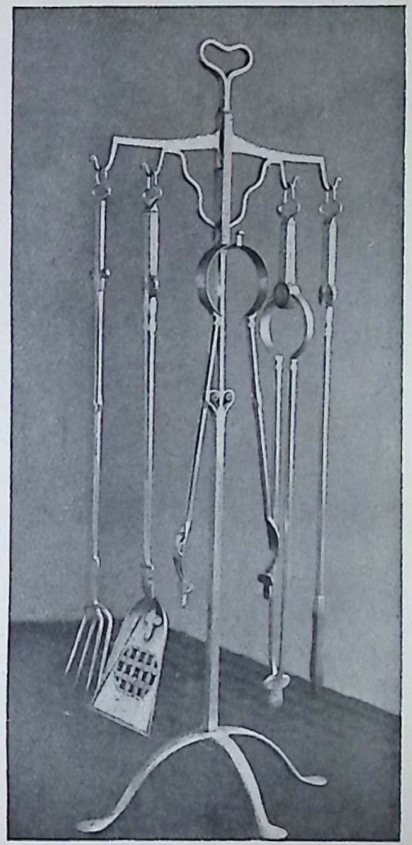


FIG. 98.—Fire-irons in Wrought Iron, by Ernest W. Gimson.

Hollow shapes, as cups, chalices, bowls, &c., are first "sunk" by means of a round-faced mallet on a sinking block (Fig. 96) (6), which may be a piece of a tree-trunk about 2 feet high, with depressions of various sizes cut in the top. The metal should be cut to a little less size than that of the combined height and width, narrow shapes requiring rather less metal than wide ones of the same combined measurements.

Hollow pieces are hammered spirally round the shape from a circle representing the rim to a smaller circle representing the base, the blows of the hammer being delivered from the wrist, and not from the elbow, avoiding any folding of the metal, which may lead to cracks at a later stage.

After the piece is beaten true it is annealed—*i.e.*, softened by means of the blow-pipe (the rim having been previously thickened) and afterwards planished, or hammered smooth and true all over.

Other parts of the piece, if any, as for instance a foot, are raised in a similar way, the parts being afterwards soldered together and the piece "pickled" and polished.

Pickling is done by means of weak sulphuric acid, 10 ounces of water to half an ounce of acid, the acid being poured into the water, *not vice versâ*.

Hollow pieces, as cups, &c., may be decorated with various relief patterns by means of cranked Z-shaped punches (snarling-irons), having variously shaped ends (Fig. 96) (7). This instrument is employed for those parts of the piece which cannot be struck by the hammer. The work is held on the nose of the snarling-iron by the left hand, the arm of the iron being smartly struck by the hammer, causing the point of the snarler to strike the inside of the piece to be decorated, the raising being proceeded with gradually. The piece may afterwards be filled with pitch and finished on the surface with chasing tools.

Repoussé is modelling in relief by means of hammering

FIG. 99.—Ciborium, by J. H. M. Bonnor.

and punching, usually from the back of the piece, placed on some yielding material such as pitch, that allows of it being worked to the required form, and at the same time deadens the sound of the hammer and punch. Relief is produced either by hammering down to the ground of the ornament, or by punching the back and finishing on the face (Chasing).

The pitch is composed of four parts pitch, four parts resin, and two parts plaster of Paris.

The pitch and resin are melted together and stirred, adding a little tallow to make it softer. The plaster is then added gradually and the whole stirred well; it is then poured in a box, covered with dry whitening and left to cool. The pitch block is of wood of the form given in the illustration, with a leather collar to keep the work in position (Fig. 96) (13).

The design may be traced on tracing paper and fixed to the metal with bits of wax or gum, or it may be transferred by means of carbon paper, or it may be drawn in pencil, and with a fine punch the outline is delicately pricked.

To fix the metal on the pitch, the latter is warmed by means of an indiarubber gas-tube with flattened jet, passed rapidly over the surface, the metal being pressed down with a damp cloth until it adheres to the pitch.

The tools used are tracers, instruments with slightly curved points of different breadths, punches of various sizes (Fig. 96) (10), and a hammer, flat on one side and round on the other (Fig. 96) (5).

The manner of holding the tools, both tracers and punches, is most important, the tool being held nearly upright by the first and second fingers and the thumb of the left hand, manipulated by the third finger, the little finger placed upon the metal, the third just touching it.

The traced outline is done first and may be deepened at will. The blows for all hammered work must be steady and even, not violent, otherwise the metal is damaged.

Punched work may be carried further and corrections made by reversing the metal—*i.e.*, removing it from the pitch and re-adjusting it face downwards.

Small objects in the round, as, for example, small figures,

FIG. 100.—Copper Repoussé Panels, by Harold Stabler.

may be made in repoussé by working them in two halves, afterwards soldering them together, leaving a little hole at some place where it is least observed, and filling in with pitch, slightly warming the object for this purpose.

WIRE DRAWING.

Wire for jewellery is drawn to the required thinness by passing through metal gauges having holes of various sizes and shapes (Fig. 96) (14). The gauge-plate is fixed in a vice, the wire pulled with draw-tongs, first through a larger hole then a size smaller, and so on until the requisite thinness is reached, the holes of the draw-plate being filled with tallow.

The process of drawing hardens the wire, which must be softened or annealed by evenly heating it with a blow-pipe until it is faintly red, the wire being previously bound up with iron binding wire in a neat coil with no loose ends and placed upon a charcoal block, then cooled in water and unwound.

Small tubes may also be drawn in a similar way from strips of metal by forming the end of the strip into a gutter and inserting the tip of a pointed burnisher into the gutter during drawing, thus keeping the metal true. The width of the strip should be three times the diameter of the tube required. The size of the tube produced may be reduced by afterwards passing through smaller holes. The section of the tubes may be circular or oval according to the shape of the holes of the draw-plate which may be made by the worker.

For small rings to be soldered together to form part of an ornament, the wire is coiled firmly but not too tightly round steel rods of the sizes required, and then cut with a fine piercing saw, the coil being held firmly in a clam during this process.

Grains are made by melting these rings and running the metal into small hollows made with a ball punch in a charcoal block, the depth of the hollow being half the thickness of the grain.

Beaded wire, used so largely in both old and modern

jewellery, is produced by pressing metal rods between two pieces of iron in which a series of little round hollows are cut.

The chief means of enrichment of work in the precious metals is by jewels; in fact, whenever precious stones are used they should receive the first consideration, the setting being subsidiary or as supplying contrast of effect, the aim being to show the jewel to the best advantage.

The principle of setting is that the stone rests either on a ledge or on several projecting pieces of the metal, and is fixed in position either by a rim of metal attached to the ledge, plain or ornamented in various ways, or the projecting pieces grip the stone like a claw.

There is also the method of drilling the stone, passing a wire through it and fixing it by a knot, and of drilling it partly through and securing it by means of dove-tailing the wire.

Another method of enrichment is by means of enamel, which may or may not be associated with precious stones.

There are three sorts of enamel—1. Champlevé, probably the earliest form, in which spaces are cut out of the surface of the metal, filled with enamel and melted in. 2. Cloisonné, in which metal bands are soldered to the plate and form divisions or cloisons for the enamel. 3. Limoges, which is entirely different in principle, being a method of painting white enamel on a ground of darker colour previously laid over the plate, the varying tones being dependent on the thickness of the enamel laid on.

There is also a variation of the first named, known as *bassetaille*, in which patterns are engraved on the metal and coated with a transparent enamel. For Champlevé enamel the metal is domed, and may be worked either on an engraver's block or cemented on a pitch block, or for small work it may be fixed to an engraving stick held in the hand at the side of the bench. The pattern is first scratched on the metal, and the sinking of the spaces

accomplished by means of well-sharpened gravers and scorpers.

The enamel is pulverised in water by means of a mortar and pestle, and afterwards well worked; it is then applied to the different cells or cavities and fired in a muffle or a cradle of sheet iron, or small pieces may be fired in a covered crucible, with blow-pipe and foot bellows.

The metal strips for Cloisonné are made by passing wire or thin strips of metal through a draw-plate having either elongated holes which must be made specially, or, if the holes be circular, the wires must be afterwards flattened in a flatting mill—*i.e.*, a machine with two iron rollers like a mangle. After each pull through the draw-plate the wire must be annealed and cleaned; it is then bent in short pieces to the form required, and fixed in position on the object by means of tweezers and pliers, the design having been scratched finely on the metal by means of a steel point, the object being cleaned by weak sulphuric acid. The solder, consisting of three or four parts silver to one of brass, is mixed with borax and fixed by means of the blow-pipe.

The powdered enamel is then laid in the spaces, as in the case of Champlevé; the piece is then fired, necessarily at a lower heat than the melting-point of the solder. The enamel is then filed down to a smooth surface and rubbed with pumice stone and water.

Designs are made on paper in colour, the chief practical consideration being to draw such curves as are most easily workable—*i.e.*, those suggested by the bending of the metal strip, long straight lines being avoided.

There is a variation of Cloisonné known as Plique à Jour, in which a metal network of pattern is filled in with enamel, which has no ground but is supported by the metal pattern. In this, the leading lines and general construction of the design should receive careful consideration, the different parts so arranged that the whole is held well

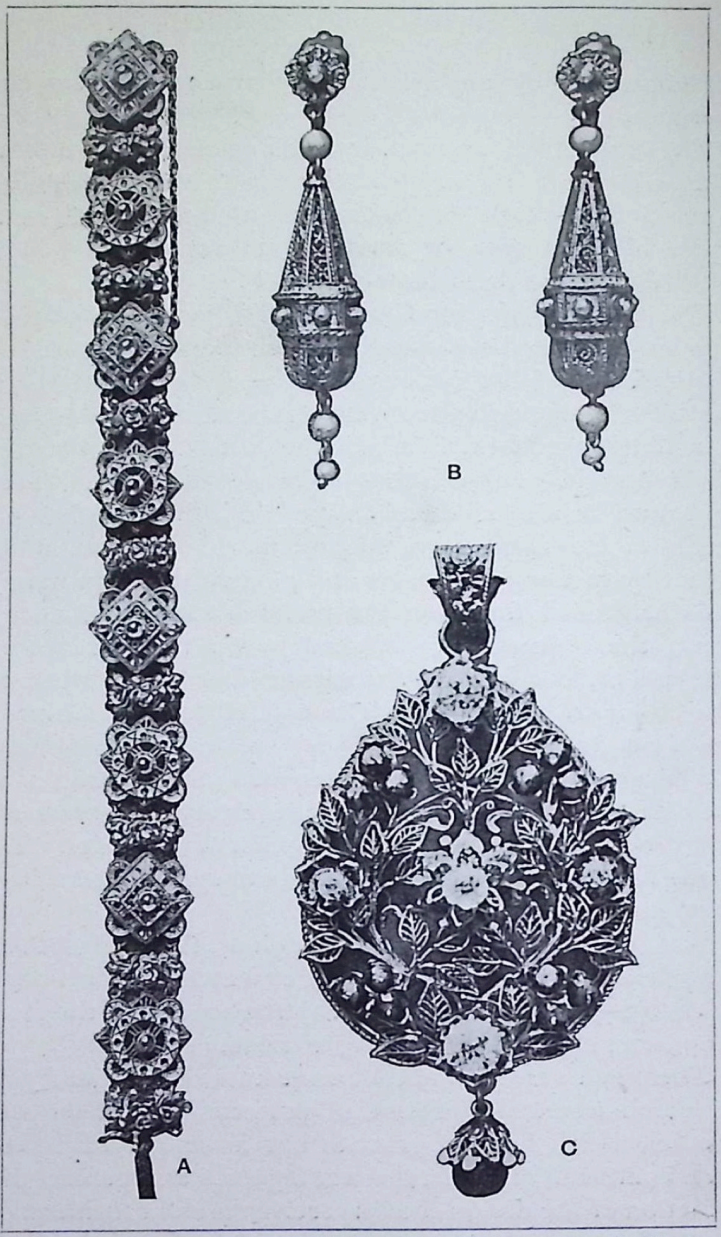


FIG. 101.—A, Gold Bracelet, Gold Medal Work, N. C. 1910; B, Earrings, Silver Medal Work, 1911; C, Pendant—by Alice M. Camwell.

together, on the principle of the lead lines in stained glass.

For painted enamels the plates are usually concave, shaped so by means of a burnisher on a concave block of wood. The plate is cut to shape with a pair of shears, heated to redness and plunged into a bath of weak nitric acid to anneal it—*i.e.*, to soften and remove the scale. It is then well rubbed with fine powder, emery paper, bath brick or pumice stone, dried and placed on a mould and burnished. The illustration forming the frontispiece is an admirable example of a painted enamel, by one of the most practised craftsmen.

With respect to design there can be no possible question that in metal work, especially jewellery, invention and craftsmanship must walk, as it were, hand in hand—that they are, in fact, one and indivisible, that craftsmanship induces and suggests design.

The student must turn continually to the only true source of inspiration, Nature, and utilise the endless suggestions offered by those jewels of the field, the flowers, —it is scarcely possible, for example, to look at the purple Scabious, with its soft velvety petals contrasting with the discs of the unopened flowers, without thinking of jewellery.

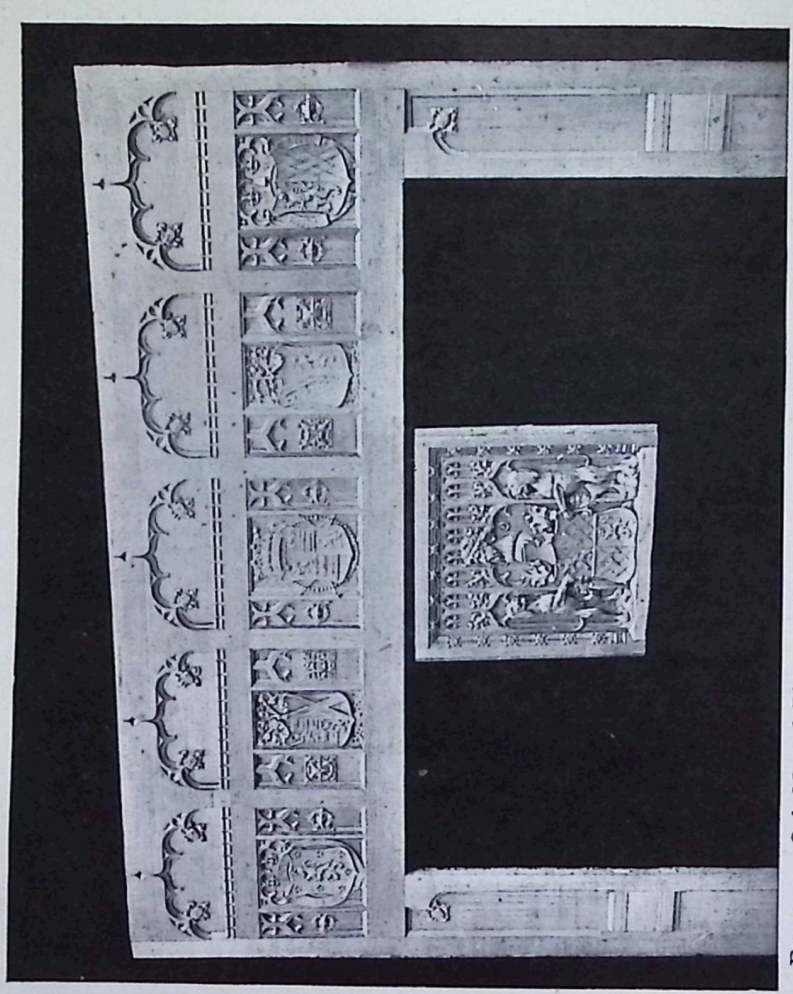


FIG. 102.—Oak Mantel-Piece at Carlton Towers, Yorks., designed by John F. Bentley, carved by J. Erskine Knox.

CHAPTER VIII.

WOOD WORKING AND CARVING.

TOOLS.

THE first requisite of the carver is a bench, which should be provided with a joiner's vice for holding in position work which is to be carved. Its length should be from 3 to 6 feet, and about 3 feet high; it should be secured to the floor by means of brackets, as the force required in carving is sometimes considerable. In the absence of a proper bench a smaller temporary one is sometimes used, consisting of a single piece of board resting on two blocks and fixed to an ordinary kitchen table by means of cramps.

Wood carving is better done standing, but slightly sloping seats about 2 feet 6 inches high may be used for low relief work or as a rest from the fatigue of standing.

The tools used are chiefly chisels and gouges of various shapes and sizes, ranging in their edges from the perfectly flat and straight to a deep hollow. There are also V-shaped edges for working into difficult corners, and square gouges (Maccaroni tools) for clearing out the ground in various ways. The width of these tools varies from one-sixteenth of an inch to 1 inch. The blades are made both straight and spade-shaped. Some carvers have the handles of these tools made of different coloured woods, so as to be able to select them quickly during working (Fig. 103) (5).

The number of tools made is considerable, but a careful selection of from twelve to twenty from the catalogue of

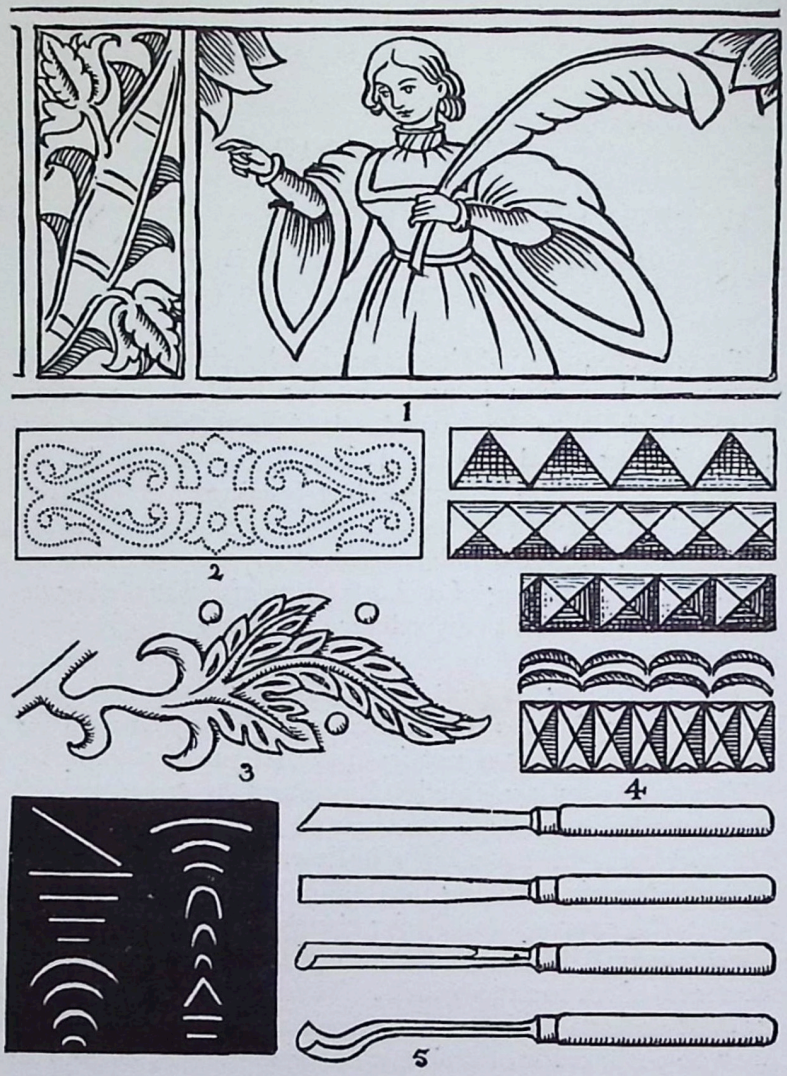


FIG. 103.—1, Incised Panel from Seventeenth Century Coffer of Cyprus Wood; 2, Punched Work; 3, Conventional Relief Foliage; 4, Chip Carving Patterns; 5, Carving Tools and Sections.

any good maker (as Buck of Tottenham Court Road) will suffice for the beginner.

Tools as purchased from the maker are ground but not sharpened, and since it is imperative that they should be kept in good condition for working, the sharpening is an important matter.

The different oil-stones used are Turkey, Washita, India and Arkansas, there are also slips with rounded edges for sharpening the insides of tools. The oil used is Olive, with occasionally a little paraffin.

Stones are fixed in a block or case, the block having two pins underneath to keep it firm in position during use.

The sharpening of tools is an operation requiring some little experience and skill, as good work is impossible with a badly sharpened tool; moreover, soft woods require a more acute edge than hard, and are, therefore, held at different angles on the stone during sharpening. Round edges should be avoided as they destroy the keenness of the tool, which after sharpening on the stone must be stropped on both sides on a piece of leather to destroy any burr.

The sharpening of chisels is a comparatively easy matter, the edges being straight; for the round-edged gouges, however, more experience is required, as in addition to the backward and forward motion the tool must be rolled from side to side, necessarily, since all its sides must be sharpened evenly. One side of the stone is kept for chisels and the other for gouges.

The insides of the veiner and V-shaped tools must be sharpened on a knife-edged slip and must be afterwards stropped as previously indicated. For the spoon-shaped tools it is usual to roll up a piece of leather until it fits the hollow of the tool.

With a little practice and experience the worker will perceive what is required and will soon realise that a little extra practice and pains given to sharpening is by no means thrown away.

A round mallet of about 4 inches in diameter is used for driving the tools when extra force is required.

The varieties of woods are almost infinite, but for carving purposes may be divided into three classes—hard, soft and intermediate. The first includes Oak, Ebony, Walnuts, and Mahoganies; the second, Pines, Bas wood, and Lime; the third, Beech, Holly and Sycamore. There are also the following, which are used for special purposes—Sandal wood, Cherry, Pear, Box, Briar, Lance wood and others.

English oak is an ideal hard wood for the purposes of the carver; its two sets of rays—the large thick ones forming the figuring together with the smaller ones, giving a quality of surface which no other wood can surpass. It shrinks a good deal in seasoning, and even when dry will shrink again in those parts exposed by fresh cutting.

Of Walnuts, the Italian variety is the best, being more even in texture and having less figure than English.

Mahogany is somewhat unfashionable at present on account of its extensive use in cheap veneered furniture. The varieties are Spanish, Honduras and Bay, the first-named being the best.

The Weymouth or Yellow Pine is the best soft wood for carving purposes, and when free from knots is an admirable wood for the beginner.

Wood working may be divided into two classes—1. That on the flat surface, including inlay and the various methods of incision. 2. Carving in relief or in the round. Occasionally these two methods, opposite in principle, are associated—*i.e.*, a piece which has carved relief in its parts may have its plain surfaces decorated by inlay or other kindred methods.

There are two principal methods of wood ornamentation on the flat surface—firstly, incisions, either with a blunt instrument by means of pressure, or punching; secondly, inlay (Marquetry), in which a thin veneer of various woods or other materials, such as Ivory or mother of pearl, is

inlaid to form various patterns. Both these processes were largely practised during the 14th, 15th and 16th centuries, chiefly in Italy, where both arts attained perhaps their highest development. They are employed either by themselves, or as auxiliaries to carved work.

Of incised work, the beautiful Italian marriage coffers of the latter part of the 14th and beginning of the 15th centuries form the best examples; in these, costume figures, elaborately patterned, are associated with equally elaborate ornamented background, the effect being extremely rich and ornate, though the depth of the incisions is slight, being usually not more than one-twelfth of an inch; the pattern is filled in with coloured mastic, either black, green, or indeed any colour desired. The wood used in these coffers is generally Cypress.

The varieties of incised work are as follows:—1. The outline of the pattern is incised with any instrument capable of making a smooth groove in the surface of the wood, a wheel tool, an ordinary engraver's burnisher, or the V carving tool. 2. The pattern is outlined with a V tool and the ground removed with a gouge, leaving the ornament flat. In either of these processes colour may be, and is, applied in the grooved lines in the background, which is cut away; or in both background and raised ornament. Most excellent decoration may be made in this way, making use of soft woods which are ready to hand and easily worked, the ornament being arranged as far as possible on one plane—*i.e.*, leaves and flowers should not cross each other. The depth of the background should be about a quarter of an inch. Colouring may be done either in water or oil.

Designs should be made on paper and the outline transferred to the wood by means of blue carbon paper, or they may be drawn in pencil.

During the latter half of the 16th century a style of incised wood was produced, both in England and

elsewhere, having much of the flavour and vigour of the earlier forms of metal engraving, the lines being produced by means of some form of V tool and filled in with a black composition. The panel of the lady with feather fan is taken from an English coffer of Cypress wood, early

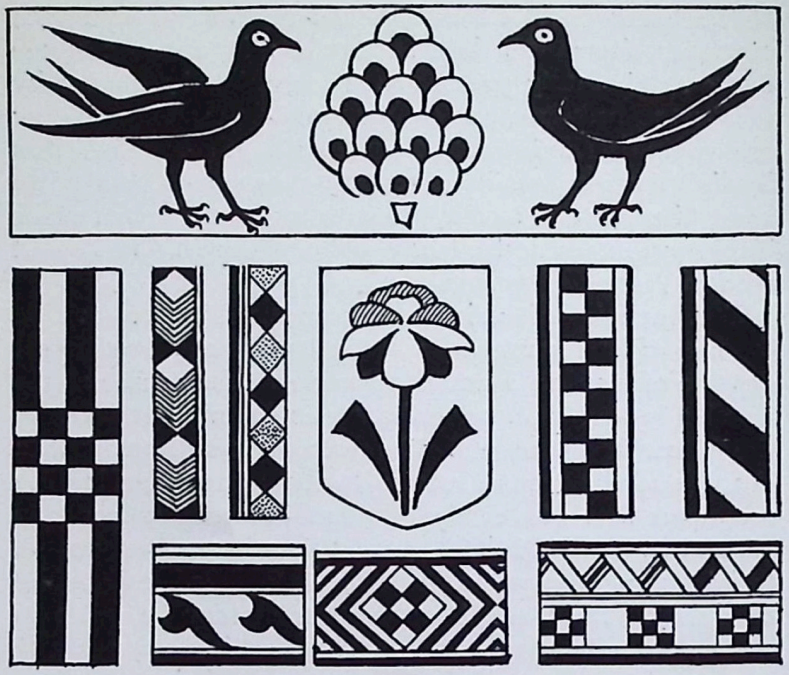


FIG. 104.—Various Marquetry Patterns.

17th century (Fig. 103) (1). This is a method that might very well be adopted at the present time, employing as a matter of course modern designs.

The method of punching by means of straight pieces of metal ("matts") shaped at the ends in various ways, as circles, stars, diamonds or squares, is extremely simple and effective. The ornament may be in outline formed by a series of punched holes as in the illustration given

(Fig. 103) (2), or the outline may be incised with the V tool and the background filled in by punching. The effect may be further heightened by gilding either the ornament, or the background, or both, this process being identical with that of the gilded backgrounds of early Italian pictures.

WOOD INLAY.

Wood Inlay, Marquetry and Parquetry became great arts in the hands of the Renaissance craftsmen and are still largely and successfully practised.

In Marquetry, the ornament is cut from veneers, the ground being gouged out with carving tools; in Inlay the ground as well as the ornament is cut from overlays.

Parquetry is simply marquetry on a larger scale and applied to more extended areas, as for instance floorings, in which the elements, as in much marquetry, are geometrical forms fitting into each other and forming repeating patterns.

The simplest form of marquetry consists of geometrical patterns made up of squares, triangles, lozenges, stripes &c., in which the darker woods, such as Ebony and Bog Oak, are contrasted with the lighter and various coloured woods, such as Pear, Cherry, Ash, Satin wood, &c., Ivory and mother of pearl being also used as a further enrichment.

It will be seen from the few examples given that the play upon these simple forms is practically inexhaustible, and that the contrast of these geometrical forms with designs of a more ornamental or pictorial character or with carving is most effective (Fig. 104).

Many articles of furniture, as coffers, cabinets, &c., were produced during the 16th century, especially in Italy, entirely made up of geometrical forms, a free use being made of the contrasting tones of Ivory and Ebony. As the art progressed, foliated forms, at first simple in character and afterwards more ornate, architectural subjects, both

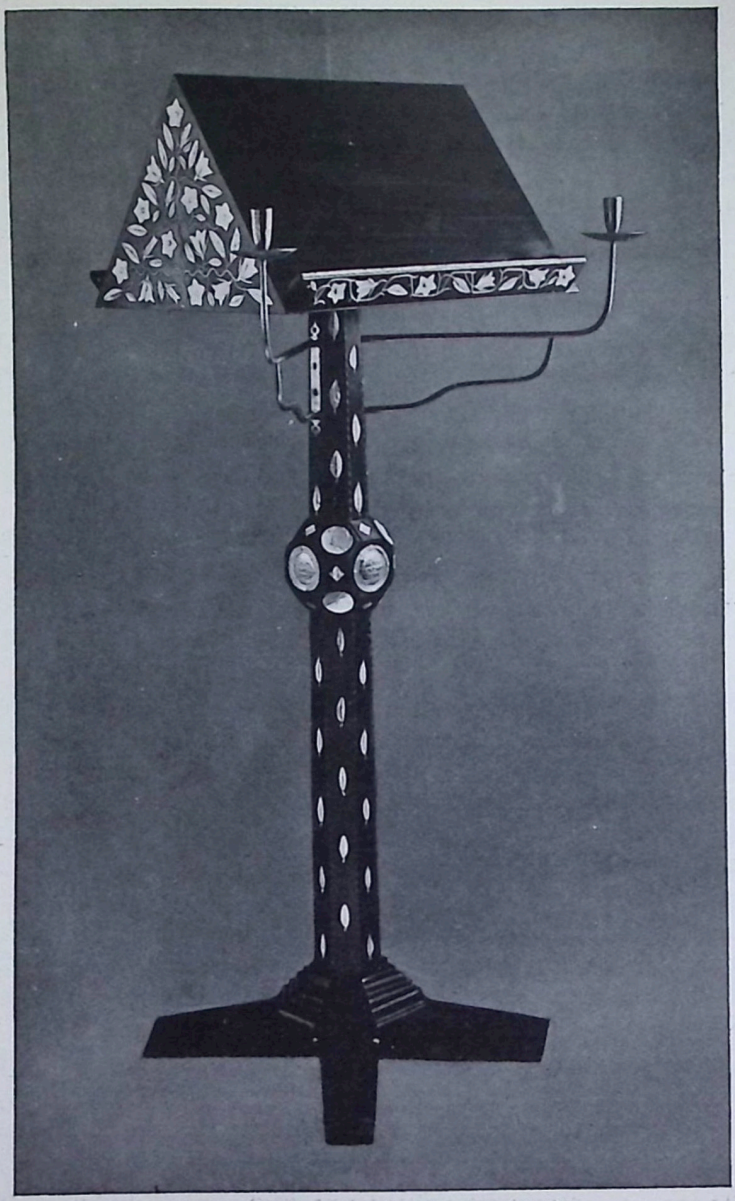


FIG. 105.—Inlaid Lectern, by Ernest W. Gimson.

designed on the flat and in perspective, and even elaborate figure subjects were treated. There is, however, a limit to the legitimate treatment of marquetry, the elaborate effects produced by the workers of the period of Louis XIV. and later, although extremely skilful, are less satisfactory than the earlier and simpler work.

The method is as follows:—The veneers may be obtained in various thicknesses, from a paper-like thinness, which may be cut with scissors, to the substance of ordinary fret wood.

The cutting is usually done in several thicknesses at once for repeating patterns, the pieces being fastened together, thus saving time as well as securing absolute uniformity, the pattern being as a matter of course traced on the wood before cutting.

The fastening together may be effected by means of pinning up, or by means of small wire nails driven in, a fine saw being used for cutting.

The veneers are laid down and fixed by means of glue. If there should be any gaps or empty spaces in the design, due to inaccurate cutting, these may be stopped by means of melted shellac mixed with powder colour of the required tint.

When the work is set sufficiently hard it is rubbed down with the finest sandpaper (Fig. 105).

Stringings—*i.e.*, narrow strips of various woods—are sold in lengths for the making up of borders and geometrical patterns.

Chip Carving is at once the simplest and earliest form of wood carving, practised by most barbaric peoples and the peasantry of most ages and countries, but at present, in Europe, it is mainly confined to Scandinavia and some parts of Germany, where a number of the ordinary objects of daily use, as paper knives, bread platters, potato bowls, book racks, &c., are produced.

Chip carving forms a very excellent introduction to

wood carving, since, firstly, its methods are simple, the patterns being mostly made up of geometrical forms, as the square, triangle, lozenge, circle and semicircle, together with a few scroll patterns accomplished by the veiner and V or parting tools; secondly, it is an exercise in patience and precision; thirdly, it familiarises the worker with the material.

Almost any example of barbaric wood carving will give a number of *motifs* which may be worked into a design. The simplest pattern is a series of alternated triangles, the lower border being sloped down to the apex of each, and the upper left level with the surface of the wood (Fig. 103) (4, first example).

This pattern may be doubled, giving a series of triangles sloped from the sides, and leaving a series of lozenges level with the surface.

The third figure represents a variation, while the fifth shows a further development.

It is unnecessary to multiply instances, those given will explain the principle. A quarter-inch spade chisel is the most useful tool to start with.

The designs are first set out on the surface of the wood in pencil, using compass and scale. This type of work may be done on an ordinary table without any appliances for fixing, as the left hand is free to steady and turn the work. Veined lines, however, are best accomplished with the wood fixed firm.

It now becomes necessary to consider the important question of relief, and how far the imitation of natural forms may be legitimately carried in carved wood work. A number of different conventions have been adopted at various periods for various purposes—for decorative effect when the object is at a distance from the eye, for the economising of labour, and also, in the case of primitive work, to suit the limited technical skill of the worker. Foliation has been expressed in a variety of ways—by the simplifica-

tion and emphasis of the veining and serrations, by the gouging out of various forms in the blade of the leaf as a substitute to the play of light upon the natural leaf (Fig. 103)(3); and lastly, as mere manipulative skill became more developed, the utmost fidelity to natural form has been expressed, in many instances with small gain to artistic effect.

It is impossible to lay down hard and fast rules, except that the decorative principle must in all cases be adhered to; carved ornament must look intelligible and coherent from the distance that it is intended to be viewed, the use to which the thing is put must be carefully considered —a chair-back must have no uncomfortable prominences, the handle of a knife must be capable of being grasped with ease.

It must be pointed out that in relief work we deal with form only, not colour, although there are modern practitioners who affirm (quite erroneously) that colour may be *suggested* in sculptural form. We therefore select for study those natural objects which have qualities of form rather than colour, as, to quote an example from plant growth, the formal qualities of the Madonna Lily are of a higher order than those of the Geranium or Wallflower, both of which latter possess high colour qualities.

The most important thing in connection with relief is the play of light upon its surface. Our work, therefore, is a play upon the two contrasting qualities of light and shade. The " eyes " of leaves are gouged out in order to catch pretty pieces of shade which give vivacity to the design; the edges are emphasised in order to receive light, turned over so as to throw shade.

In the treatment of the hair of human beings and the fur of animals the same principles are adopted. Lines and masses are emphasised for contrast, for effect at a distance, and to supply the place of colour in the natural object. We therefore perceive the imperative necessity for adopting these various conventions—our resources are limited

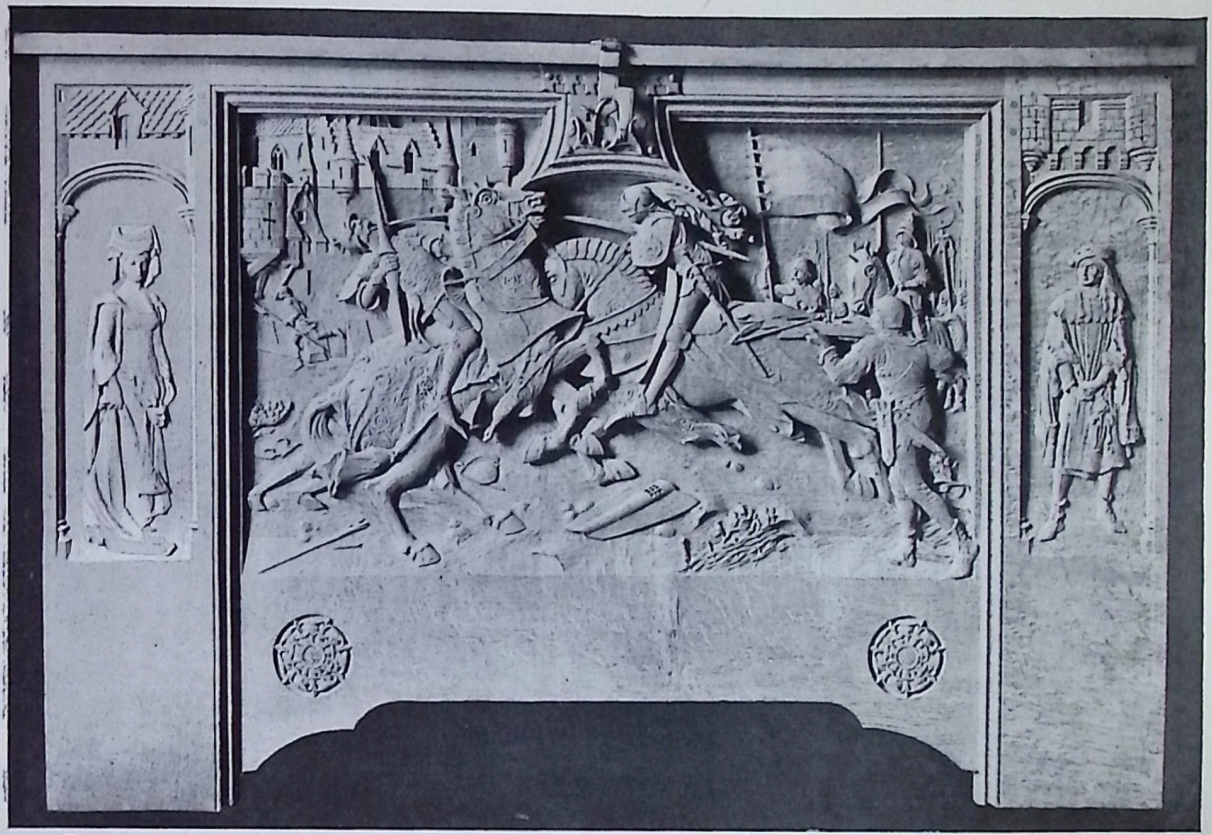


FIG. 106.—Oak Chest, designed by Fred Roe, R.B.A., carved by W. Aumonier. (By the Courtesy of Sir William Lancaster.)

to the material in hand, those of Nature are practically inexhaustible.

Further, the position the work is to occupy determines not only the character of the design, but the treatment of the carving. If it be close to the eye, finish is demanded; if at a height and seen from a distance, breadth, simplicity and boldness of handling are a necessity.

With respect to working designs there appears to be a general consensus of opinion among wood craftsmen, although it must be confessed that this opinion is not always shared by architects, that drawings rather than models are preferable to work from; that the wood possesses its own character and demands its own treatment, and a different treatment to any plastic material such as clay. For figure work in the round, however, or for very high relief, a model will obviously be of great assistance, especially as an able carver can impart to the work that character which is essentially of the wood. To quote Mr. W. Aumonier: "The work should always be, or appear to be, carved out of a solid block, aiming at broad lights and deep shadows, the high parts comparatively smooth, or at least little disturbed by modelling, to catch light; the depths rough and choppy, the better to hold shadow; the ground by no means absolutely flat or smooth, but deepened in parts where strong shadows are required to strengthen the effect; and the relief so arranged as to incorporate the ground and the work together as much as possible. And if we have invention and lightness combined with breadth and strength in one harmonious whole, the work sparkling with gouge-cuts to give it texture, I think we have the essence of wood-carving."

Relief work may be enriched—1. By gilding. 2. By colouring. Gilt work calls for a somewhat different treatment on account of the presence of strong reflected light. The shadows, therefore, in high relief are emphasised, the lights left smooth and strongly defined, the

background slightly undulated to give play of light and variety.

For gilding, the carving is treated with a coating of whitening and thin glue, and in the case of burnished gold this process is repeated a number of times and rubbed down between each application with pumice stone and glass paper, the work afterwards receiving a coating of red gold size.

Colour is applied freely in the softer woods to emphasise the carved work, and may be made extremely effective, as in the four Italian thirteenth-century columns and capitals in the Victoria and Albert Museum.

CHAPTER IX.

DRESS EMBROIDERY, FANCY COSTUME, AND THE FASHION PLATE.

EMBROIDERY is the decorative enrichment of a given material by means of the needle, and although the present inquiry is mainly confined to dress, the leading principles are applicable also to all other forms of embroidered work.

Broadly speaking, the quality of the material determines the character of the work put upon it. One would not, for example, expend a great amount of time on such a material as sacking, but would reserve the finer and more elaborate work for the richer fabrics as silk, satin and brocade. Further, silk is the only possible thread for the adornment of these more sumptuous stuffs, linen or wool thread being manifestly out of place, and although one would not adorn sacking, or even loose woollen fabrics, with silk, the last-named thread may very well be used on both linen and canvas. Precisely the same principle applies to gold and silver thread and precious stones, although some of the metallic threads now made look very well on a woollen foundation if used sparingly as a precious enrichment, in a similar way to the employment of lustre in the best examples of lustred pottery.

Silks for purposes of embroidery may be either plain or figured, as damasked silks often give an added richness to the work, forming a subordinate ground on which the embroidered work is superimposed.

Satin may be used for small work, although its shiny surface interferes with the effect of the embroidered work.

Plush is an unsuitable material on account of the nature of its pile.

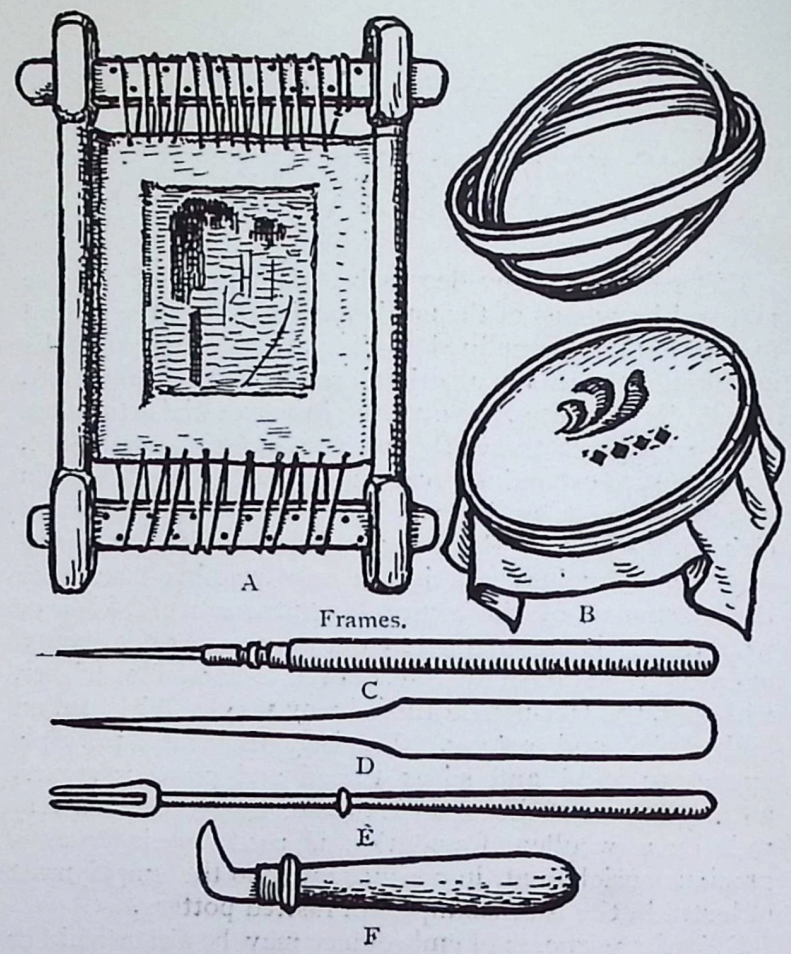


FIG. 107.—Tools.
A and B. Frames. C. Pricker. D. Piercer. E. Spindle for winding gold thread. F. Knife.

Linen is most admirable for either silk or wool work, the Langdale hand-spun being the most satisfactory.

Of woollen materials, both cloth and the different serges may be used, the former being especially suitable for appliqué.

The filet nets, woven with square mesh, fashionable at the present time, are admirably suited to embroidered or darned work. Collars and cuffs, blouse fronts, panels and borders for dresses may be made very effective in this material, using "Mallard" floss silks with, if desired, further enrichments in China ribbons, sequins, beads and gold thread.

If black net be used it should be of silk, as black cotton very quickly turns a rusty brown.

There are three methods of working—1. By means of a square or oblong frame, consisting of four pieces of wood fixed at the corners, the top and bottom pieces being flat and passed through the two side pieces, with pin holes at intervals (Fig. 107, A), these are often placed upon trestles or stands. 2. A small circular frame held in the hand, consisting of two circlets of cane fitting within each other, the material being drawn tightly between (Fig. 107, B). 3. The material held loosely in the hand.

There are broadly two methods of making a stitch —1. The needle is passed horizontally through the material as in ordinary sewing, one pull only being necessary to complete the stitch. 2. The needle is passed vertically from beneath, pulled through and returned downwards, a second pull being necessary for completion.

Stitches are almost innumerable, but may be classified under two groups—1. In which they lie flatly and are either short or long, as darning stitches, tent and cross stitches, satin stitches, crewel or feather stitches which are a combination of both short and long. 2. In which the thread is looped, as chain, knotted and buttonhole stitches. There is also a stem stitch, which is a series of short stitches worked diagonal-wise.

Couching is a system of stitching down cross-wise a series of cords or gimps laid side by side, gold cords being

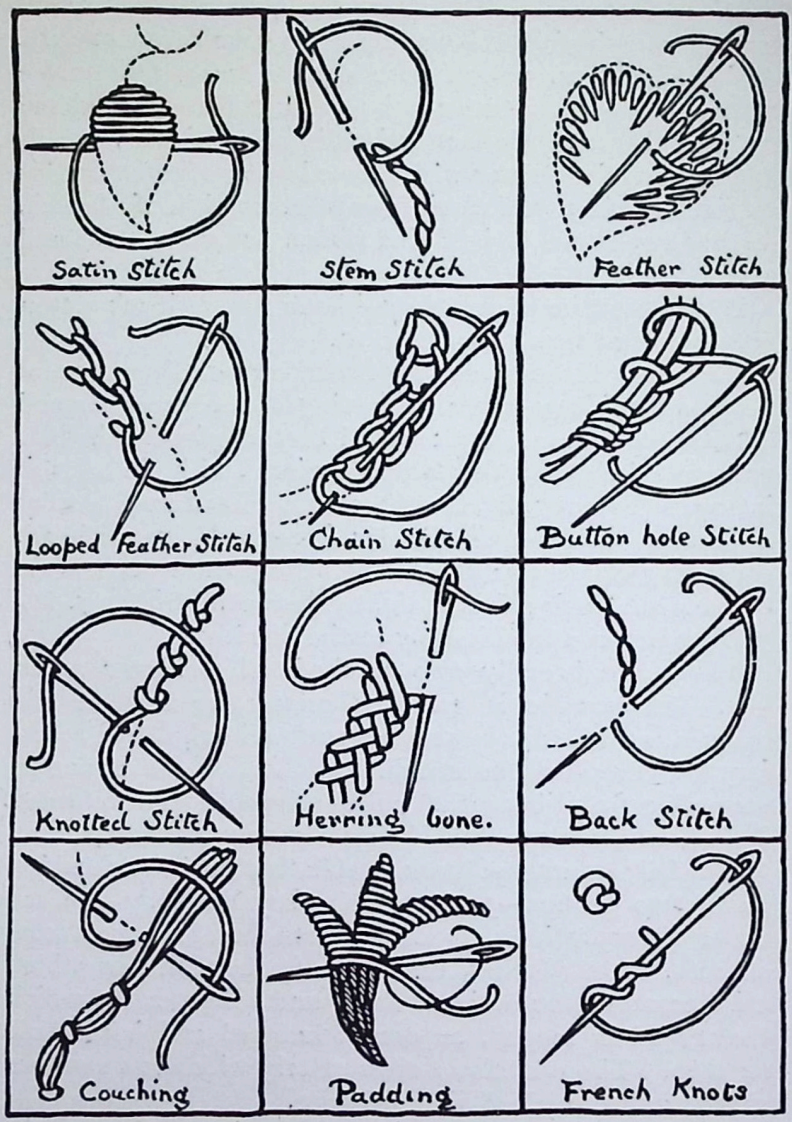


FIG. 108.—Stitches.

often used with the cross-stitching in colour, or coloured thread may be employed with cross-stitching of a different colour.

French knots are formed by twisting the thread several times round the needle and locking it with a thread in the centre (Fig. 108).

In the split stitch the needle is brought through the preceding stitch.

There are two distinct methods of working the material —1. In which the effect is to be seen only on one side (chain and crewel). 2. In which the result is similar on both sides of the material—darning and satin stitches may be so worked.

The foregoing comprise the various methods of plain embroidery. There are, however, developments. Appliqué is a system of cutting out forms or shapes in a different material to that used for the ground work, and applying or stitching them on, the edges being concealed or decorated in various ways. The advantage of this method for certain classes of bold work will be obvious: it saves time, it enriches the work, it introduces a fresh element. It is particularly adapted for dress in the heavier materials.

A certain degree of relief (raised work) may be obtained by padding in various ways, as a layer of stitches worked in a transverse direction to that of the surface layer; a piece of cloth cut to the shape required and sewn down; or a series of threads may be "couched." The stitch for the final layer is generally some form of satin stitch.

Drawn thread work may be said to form the connecting link between embroidery and lace, since it partakes of the character of both. It is of two kinds—1. In which the threads of either warp or woof are withdrawn and the remaining threads worked over in various ways, forming a pattern. 2. Cut or open work, in which both warp and woof are cut away, the spaces being filled with various

FIG. 109.—Fragment of Ancient Greek Sculptured Drapery (Museum of Athens).

FIG. 110.—Designs for Children's Dresses, by Mrs. F. H. Newbery.

devices. The principle is the same, one being really a development of the other. Usually the limit of the pattern is first hem-stitched before the threads are withdrawn.

In designing a dress intended for enrichment with embroidery, the first consideration is the shape, which obviously should possess some claim to beauty of form and proportion, since one would not expend thought and care on the ornamentation of an ill-considered shape. This would be arranged in accordance with the character of the embroidered work, which mainly resolves itself into two opposite systems—1. The all-over principle, in which the ornament takes the form of a powdered or diapered pattern, quite suitable for certain kinds of dress. 2. That of concentration, in which one particular part, for example the yoke, is enriched and the rest kept plain and, possibly, a border round the edge of the skirt.

This principle of concentration, which may be called the pictorial or picturesque principle, may be applied to different parts of the dress, which may have no yoke, the richer portion confined to the bodice, or overflowing, as it were, to the shoulders and sleeves, or it may be confined to a particular part of the skirt, either the front or one of the sides, or both, as is seen in many Japanese illustrations.

With respect to the shape, many excellent suggestions may be obtained from past costume, indeed only fresh combinations of past dress *motifs* are possible, since everything has been tried: the whole story of costume resolves itself into a development of one part of the dress at the expense of the rest: in the eleventh century it was sleeves, elongated to such an extent that it was necessary to tie them in knots; in the fourteenth it was shoes, doubled up at the period of their greatest extravagance and fastened at the knee; in the fifteenth it was the headdress and train; in the sixteenth the skirt bulged out to the shape of an

FIG. 111.—Embroidered Bodices, by Anne Macbeth.

FIG. 112.—Queen Alexandra's Coronation Robe, designed by Frederick Vigers. (By gracious permission.)

FIG. 113.—Designs for Embroidered Panels, by Jessie M. King (Mrs. A. E. Taylor).

enormous drum. The various parts, as for example the sleeve, were developed in various ways. At one period it was puffs, at another slashes, at a third long streamers.

A few further hints as to design may be given. While gradation of tint is desirable, nay necessary, pictorial effects of light and shade are beyond the province of embroidery. The design should be conceived as far as possible on one plane—*i.e.*, the overlapping of one object by another should be avoided. Much of the artistic value of old embroidery lies in the uniform observance of this principle.

The importance of colour in embroidery cannot be too strongly insisted upon: it is indeed essentially a colour art, although form, fine line arrangement, the proper distribution of masses and texture will always have their due effect. Designs are therefore made to full scale in transparent water colour. A careful tracing is made of the outlines and transferred to the material by means of "pouncing"—*i.e.*, the lines of tracing are pricked at short intervals with a needle on a piece of baize or cloth placed underneath. It is then pinned in position on the material and dusted over with powdered charcoal if the material be light, white chalk if it be dark. The pounced marks are then traced faintly over with a fine pointed brush in some colour (Chinese white on dark material) that can be seen, but will not affect the work unpleasantly when complete. This latter is an operation requiring some care and skill, since the material is liable to be ruined by an accidental blotch or by a thick staring line that cannot be erased or covered by the work.

FIG. 114.—Designs for Fancy Dresses: Begonia, Poppy, Nasturtium, Bee, by Frederick A. Rhead.

FANCY DRESS.

There are two alternatives open to the enthusiast, fair or otherwise, who would acquire a dress in which to appear at a fancy ball. She (or he) must either expend money in the hiring, or time and pains in the making. Most people, being lazy of mind and habit, prefer the former as giving less trouble, just as the majority of embroiderers purchase ready-made transfers. There are a few, however, who, having ideas of their own, are content to take a little pains in giving expression to them, and it is to these few that the following suggestions are directed.

Having decided to supply one's costume oneself, there are again two courses open as to the character it shall assume. One must either represent some historical personage or period, or character of romance as the case may be, in either of which cases it is a question of reference to standard or other works; or one must endeavour to originate something.

Placing outside our present scope the desire to appear as a coal-scuttle, chimney-pot or popular newspaper, although much ingenuity has, upon occasion, been expended on such dress *motifs*, floral forms offer perhaps the widest and most attractive field of suggestion, and might if treated seriously, materially influence modern dress, just as the study of natural form has influenced ornamental art generally.

One of the chief considerations in designing a fancy costume, historical or otherwise, is the necessity of adapting it to the conditions of the romping modern dance. The accessories, which in many cases are mainly indicative of the character represented, as the "ribbons and laces" of Autolycus, the bow and quarter-staff of Robin Hood, the mirror and comb of the Mermaid, must be temporarily laid aside. Moreover in arranging the dress itself the degree of projection is a consideration, the headdress and paniers of "Poppy" or "Sweet Pea" must not be too wide, there must be no uncomfortable prominences or

projecting elements. The dress must be so designed as to suffer as little disarrangement and damage as possible during the "romp."

As a matter of fact, this question of the dance forms the crucial difficulty of a fancy dress entertainment, unless indeed the dances selected are in accordance with the costume.

Robin Hood and Maid Marian might with perfect propriety take part in a Morris (Moorish) dance, especially with the help of a hobby-horse and Friar Tuck, but the absurdity of the two first-named, with the Jolly Friar and Queen Eleanor as *vis-à-vis* in the Lancers will be apparent to all, as also the spectacle of the "Maiden Queen" with her great ruff and "interminable stomacher," a "bushel of pearls bestrewed over the entire figure" careering round the room in a Galop.

Apart from the manifest incongruity of "Vardingale" taking part in a modern dance, the mere physical difficulties would be insuperable; the "drum" would be pressed side-wise to an angle, the effect grotesque to the last degree. Doubtless the ideal fancy dress entertainment is that of a complete personification of the different characters, in speech and action as well as outward resemblance. This, however, implies the possession of some histrionic ability, a ready wit, a power of repartee, and just as a wise hostess generally provides against the possibility of lagging conversation some form of diversion such as dancing for her guests at an evening entertainment, so the dance at a fancy dress carnival affords a most excellent substitute for the absence of histrionic power.

A girl therefore, as a general rule, attends a Fancy Dress Ball with the idea of *dancing*. The modern dances are those that she is best acquainted with, few being familiar with the steps of a Saraband or even its successor the Minuet.

The introduction of armour presents a difficulty both with respect to male, and especially to the few female historical characters of martial proclivities, from the circum-

stance of its unwieldiness. A costume for Joan of Arc may be designed so as to overcome, as far as possible, or to reduce to a minimum this difficulty, by the adoption of a long tunic simple in construction, and made effective by pointed edging and the introduction of an appliqué embroidered shield on the breast, supplying a note of colour; the armour being confined to the arms, with chain mail for the feet. That the choice of a dress should be determined by the wearer's personality is a *sine quâ non*—a Mephistopheles far advanced in obesity would be as grotesque as a cadaverously attenuated Falstaff. Nor need the well-worn themes of the dress carnival be continually presented in the same stereotyped manner: there are other Pierrots than the too-familiar one of a Watteau picture.

Dominoes and masks will always be popular from the alluring element of mystery they engender, and although a black mask is always the most effective, it by no means follows that the Domino should retain its original sombre hue. A scarlet domino may be made to look as effective in a room as Mephistopheles always is, from the mere note of contrast that is struck. It is not necessary, either, that the Domino should retain its original shape as in the case of a definite historical character costume; we live in the twentieth century, decorative ideals have changed and are constantly changing, there is plenty of room for the exercise of fancy, if not for the higher quality of imagination, in the devising of charming dresses.

Playing Cards and Chessmen, too, are always attractive, Knaves of all sorts for some mysterious reason being more popular than even Monarchs; Hearts and Diamonds usually exciting most interest. These, although well-worn themes, never fail. In a word, it is not so much the subject that is of importance as the manner in which it is presented.

In the personification of a plant it is obvious that since the human head stands in the same relation to tne body as the flower to the rest of the plant, the head should

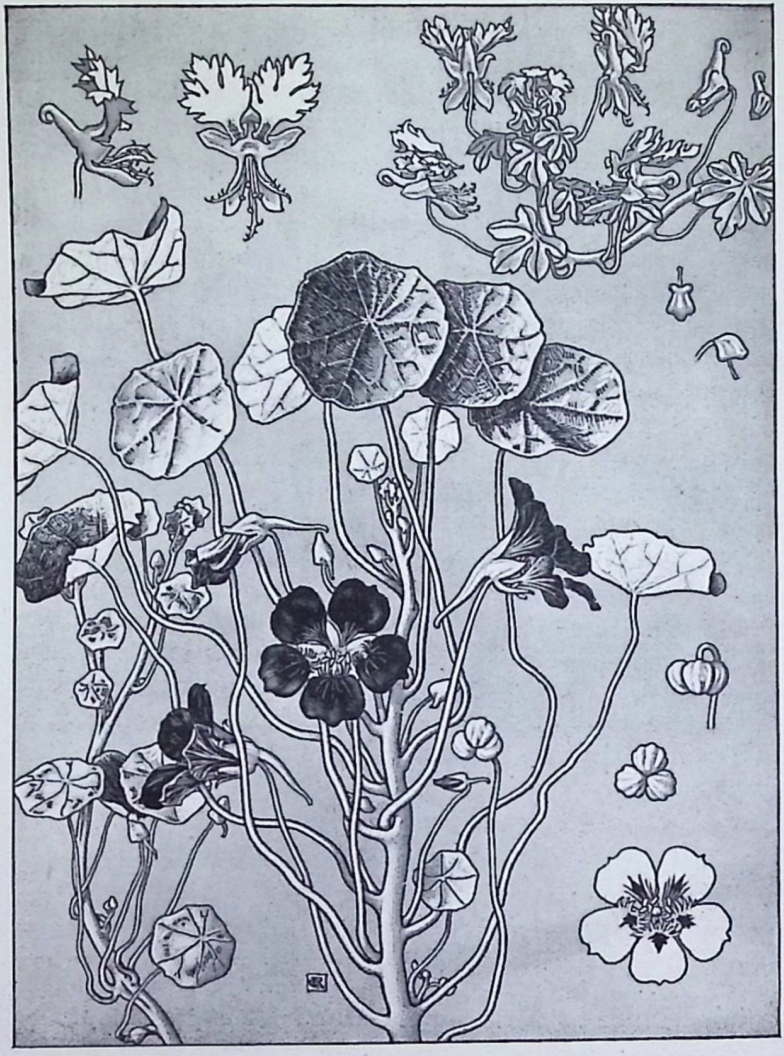


FIG. 115.—Canary Creeper and Nasturtium, by the Author.

FIG. 116.—*Canariensis* (Canary Creeper), by the Author.

represent the flower. This may be achieved in two ways—either the head, or more properly face, may form more or less a centre of an arrangement of petals round it, or the flower may be designed so as to form a hat, cap or bonnet to be placed *on* the head.

The floral headdress, therefore, determines the treatment of the rest of the costume, together with the colour scheme, which may be varied almost indefinitely from Nature's infinite store.

The flower of the pretty little Canary Creeper makes a most excellent headdress, without any change in its natural formation. The same may be said of most trumpet- and bell-shaped flowers, as Monkshood, Nasturtium, &c. Any of these may be easily made in some light material on a wire foundation (Figs. 115, 116).

It is not always possible, however, to confine the floral leaves or petals to the region of the head, although theoretically, doubtless, it would be best to do so. It must be remembered that we are dealing with a *convention*—that under no circumstances would it be possible to deck the human form in such a manner as to induce the belief that it is in reality a flower, a *suggestion* is all that is necessary or even in fact desirable, just as in the representation of a mermaid, the tail would be dispensed with.

In the illustration given of the Oriental lily, *Gloriosa Superba*, the flower forms the headdress, and this may also be achieved by the adoption of a wire foundation, the colour being yellow to bright red in the darker parts, the stamens red with yellow anthers. At the hips the floral leaves or petals with their stamens are repeated, but in two yellows only, the brightest colour being reserved for the head. These are to hang loose, cut to the proper shape either in some stiff or rigid material, or wire boundaries again used. The leaves of the skirt, together with the bordering of buds, may be either painted, stencilled or appliqué. The former are green, the dress

FIG. 117.—*Gloriosa Superba*—Study from Nature and Application, by the Author.

foundation being of a paler green; the latter is pale yellow, the bodice orange or yellow (Fig. 117).

Stencilling is most useful and effective. It may be applied to the richer materials, and the effect further heightened by embroidered work here and there, or embroidery may form the outline to a stencilled pattern. As a matter of fact, the introduction of embroidery counteracts any effect of cheapness which the process of stencilling has when applied to the ornamentation of dress fabrics, and the association of these two methods may very well be applied, indeed *is* applied, to ordinary as well as to fancy dress.

The question of material is an important one, and although the richer stuffs, as silk, satin and brocade, will always have their due effect at a costume ball, there is no doubt that much may be achieved in the more inexpensive fabrics with the expenditure of a little taste and pains.

The foregoing remarks, with their illustrations, are intended rather as suggestions, as pointing out a direction in which to work, than as providing actual designs, or the materials of design to workers, and are confined, as previously stated, to historical characters, and to *motifs* derived from floral form, rather than including the less æsthetically satisfactory but more amusing dresses illustrating a Marconi system, an airship, submarine or automobile, or as indicating the present state of the money market.

THE FASHION PLATE.

The appearance of the Fashion Plate in the recent exhibitions of the National Competition Works, the establishment of a class for fashion drawing at the Central School of Arts and Crafts and elsewhere; above all, the increasing attention now being given to the adornment of the human product, at any rate the fairer portion of it, would appear to bring the designing, making and illustrating of dress within the range of what may be called the "practical politics" of artistic design.

FIG. 118.—From the "Severall Habits of English Women," by Hollar, 1640.

FIG. 119.—"Two Ladies in the Newest Dress," *Lady's Magazine*, 1775.

FIG. 120.—Costumes of Berlin Ladies, by Daniel Chodoweicki, 1780.

This is entirely as it should be, indeed what one would naturally expect as a result of the general awakening of the decorative arts witnessed by the past few decades, for, when one comes to think of it, the adornment of a "human" assuming that Nature's marvel must be covered, is to say the very least as important as the decoration of a brick wall.

Costume may be said to have slept for a season—the canker-worm of *sans-culottism* gradually destroyed during the Revolution the last of the distinctive periods of dress. Are we in very truth on the eve of a sartorial Renaissance? Is costume, like the Phœnix, about to rise from its own ashes? These are questions that time alone can answer. Meantime we may congratulate ourselves that this matter of costume, of dress designing and illustrating, is beginning to be taken seriously by capable artists. This will, however, be no new thing, but rather a return to past conditions. The pocket-books, the precursors of the fashion plate in the latter half of the eighteenth century, were engraved by no less distinguished an artist, amongst others, than Daniel Chodoweicki (Fig. 120); the Merveilleuses and Incroyables of the Revolution were limned by the facile pencil of Horace Vernet (Fig. 121); while at a later period, during the era of Louis Philippe, Gavarni did not disdain to employ his unique powers in the service of *La Mode* (Fig. 122).

What *is* a fashion plate? The question may seem almost superfluous in view of the multitude, almost infinitude, of illustrations of dress which at the present time crowd our magazines and even invade our daily newspapers.

A fashion plate may be said to be a design or device intended for reproduction and distribution in quantity, for the purpose of giving information on the prevailing style or modes of dress.

If, therefore, we accept this definition, it will obviously be useless to look for anything answering to the description

FIG. 121.—"Incroyable," by Horace Vernet.

FIG. 122.—Fashion Plate for *La Mode*, 1830, by Gavarni.

at any time anterior to the introduction of the various reproductive processes of engraving, which was practically coeval with the invention of printing at the beginning of the fifteenth century, before which period dress had received attention at the hands of writers and artists, chiefly however in the form of satire and caricature.

In 1640 Hollar published his "Ornatus Muliebus Anglicanus," or "The Severall Habits of English Women, from the Nobilitie to the Country Woman as they are in these Times"; these may be said to have approached the nearest to the idea of the fashion plate as it is understood at present, although it is difficult to discover what purpose they could have served except as historical records, since they practically cover the whole period of the reign of the "Martyr King" (Fig. 118).

The various pocket-books above referred to began to appear about 1760, and continued throughout the century and later. They were small in size, as their title indicated ($4\frac{1}{2}$ inches × $2\frac{1}{2}$ inches or thereabouts). The illustrations, which were accompanied by original essays on various matters connected with dress, were engraved in line on steel, some representing the best talent available. The early pocket-books were soon followed by a number of general magazines, in which dress formed one of a variety of subjects. These gave fashion plates, occasionally at first, and afterwards at more frequent intervals. The scale was increased from that of the pocket-book, and colour was introduced—*i.e.*, the printed steel engravings were tinted by hand. The *Lady's Magazine* was one of the earliest of these in this country, which usually followed the lead of France in the matter of dress and its illustration (Fig. 119).

The fashion plate received, perhaps, its greatest development at the hands of the Vernets, Carle and Horace, the precise extent of whose labours in this branch of art having up to the present been undetermined; the large

FIG. 123.—Designs for Dresses for Mannequins, by Marjorie Grey.

FIG. 124.—Designs for Fashion Plates, by Helen S. Oliver.
(Bronze Medal Works, National Competition, 1911.)

set of Merveilleuses and Incroyables by the last-named mark, perhaps, the highest point that it has ever reached. These were finely engraved in line by Gatine and delicately tinted by hand.

The process of aqua-tint was also employed in conjunction with line in a fine series published in the Gallery of Fashion, 1794. These also are carefully coloured by hand.

It may be well to point out the distinction between a fashion plate and a design for a lady's dress, or gentleman's for that matter, fancy or otherwise. The former may scarcely be said to be a design (although illustrations purporting to be designs appear from time to time in our newspapers), but rather an illustration of something that is actually in being. There is no reason, however, why they should not *influence* fashion, instead of merely recording it. There is little doubt but that they would, if the subject were generally taken up by artists of creative talent.

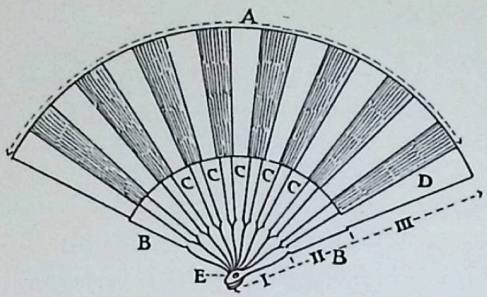
The fashion plate may be said to have fallen from its high estate upon the substitution of wood for steel as a method of reproduction, and still more with the introduction of "process," although the employment of wood as a method does not necessarily preclude fine art; but the fact remains that steel is the graver method and the more costly method, and consequently more care was bestowed upon the illustrations. Steel, however, is now completely out of the question, and wood also, for this purpose. The popularity of the three-colour process has led to much fashion work being reproduced in colour, and it is in this direction that we may look for further developments, in this and the decorative pen line. Successful fashion-plate work is paid for at a high rate, and this circumstance doubtless accounts for the crowds of young ladies who invade the different schools of art for the purpose of receiving instruction; moreover, there is also a very prevalent notion that a fashion plate requires but little artistic knowledge.

The work is either done in wash (lamp black and Chinese white) or pen line on a smooth-surfaced paper or cardboard. No precise instructions can be given, except to study the better examples of work done, to endeavour to improve on their weak points as regards character, proportion, &c., and to supplement this by a course of study of the natural draped figure; the lessons given by so-called experts at high fees are generally useless.

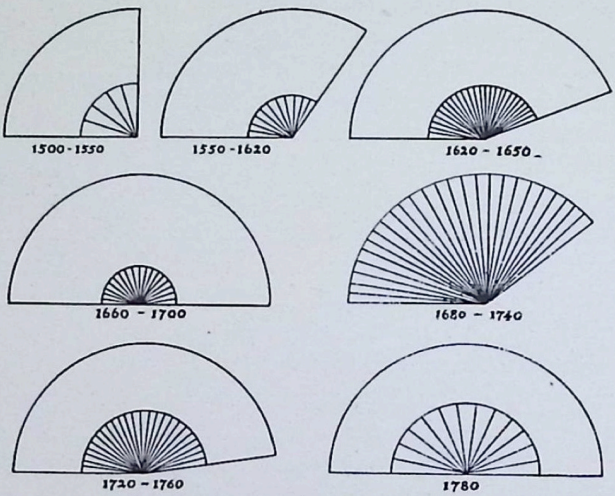
In France the fashion plate has always been taken seriously, and artists of standing have continuously been, and still are, employed in its production, although the camera is fast taking the place of hand work.

It is one of the curiosities of illustration that the art of the fashion plate should be redeemed by a purely mechanical process as is photography. Under what must perforce be called the healthy influence of the camera the extraordinary conformations of the fashion-plate figure, representing an ideal that the modern girl evidently attempted to live up to, are slowly disappearing, and a gradual return to natural form and proportion is being made.

Recently a more decorative tendency has manifested itself in much fashion-plate work of different newspapers, several artists of approved reputation having come into the field. Much more, indeed, might be done in this direction. A lady's dress, including, of course, the lady, will provide the most charming of decorative *motifs*; a fashion illustration offers ample opportunity for the display of dainty fancy, both as to the design of the dress itself and the treatment of the accessories, such as, possibly, floral borderings or what not; further, this matter of the decorative dressing of the human, together with its illustration, *is of the first importance* if we continue to cultivate our æsthetic sense, and there can be little doubt that in the very near future dress will come to be regarded as one of the fine arts, as indeed it is, to some extent, in Paris, where dresses are shown at the annual exhibitions of the Salon.



The Parts of the Folded Fan.



The Proportions of the Folded Fan at Different Periods.

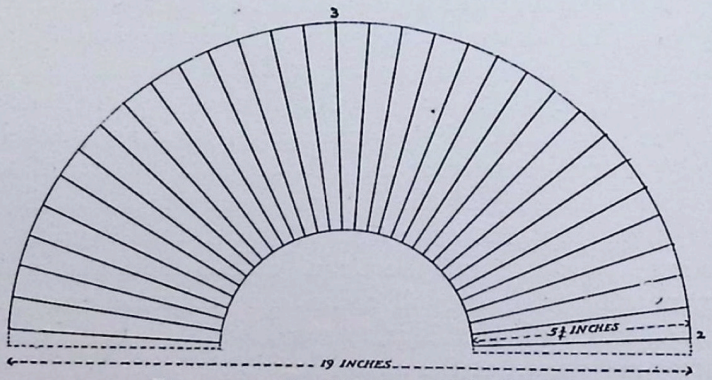


FIG. 125.—The Pleatings of the Leaf.

CHAPTER X.

FANS AND LACE.

THE folding fan, although its origin may be traced back to a very early period of the world's history, may be said to be, practically, a modern product—*i.e.*, it belongs to the last three centuries. During that period—comparatively short considering the Fan's long history—it has remained the sole heir and last representative of a long ancestry. The older forms of the fan, the rigid screens and feather and tuft fans of an earlier period, are not likely to be revived, for the folding fan possesses one great advantage over most of its progenitors; it may be closed easily to a convenient size and shape, an important *desideratum* in these days of economy of time, space and energy; the shape of its leaf is a most inviting one to the decorator. The stick, which contrasts so pleasantly with its accompanying leaf, provides opportunity for the carver in wood, ivory, shell and horn; the worker in metal; the enameller; the jeweller.

It may be well to describe in detail the various elements composing this fan-type which has become so universal:—

It consists, as already hinted, of two principal parts—the stick (*la monture*), shown in the accompanying diagram (Fig. 125) at B. B., and the leaf (*la feuille*), A. The former is made up of a number of blades (*brins*), C. C. C. C., and are folded within two guards *(panaches)*, D. The guard consists of three dimensions—the handle-end (*la tête*), I.; the shoulder (*gorge*), II.; and the guard proper, III. The

whole stick is riveted with a pin (*rivure*), E., which is often jewelled.

The proportions of the folded fan have, in obedience to the caprices of fashion, varied considerably at different periods, and although no *absolute* rule of development can be formulated, the accompanying diagrams (Fig. 125) give an approximate idea of the various changes that have taken place since the period of the general adoption of the folded fan in Europe.

Its size, also, has been subject to many variations; at the present time the prevailing tendency is towards small fans, varying from 10 to 18 inches in their extreme width and opening to a full semi-circle, or nearly so.

The leaf has been composed of various materials, as skin (absurdly called chicken skin, really kid subjected to a particular treatment), vellum, parchment, silk, satin and paper.

Skin leaves were invariably employed for the richer fans during the seventeenth and earlier part of the eighteenth centuries. This material possesses several advantages over vellum and parchment; it is soft and pliable, and although the old painters generally used Gouache (body colour), the transparent medium may also be used, but in conjunction with body colour. If used entirely by itself it is apt to look thin and poor.

Vellum and parchment necessitate body colour, and there is no reason why a modern fan should not rival the glories of an illuminated MS., except that if gold be employed it should be flat, as if it be raised the constant opening and shutting of the fan would wear away the gilding and leave the raised portions more or less bare.

Silk, however, is the material most generally favoured by modern fan painters; and there is no doubt that a good taffetas offers quite an ideal surface for the free flow of the brush (Fig. 126).

Most of the stiffer silks take colour well, although

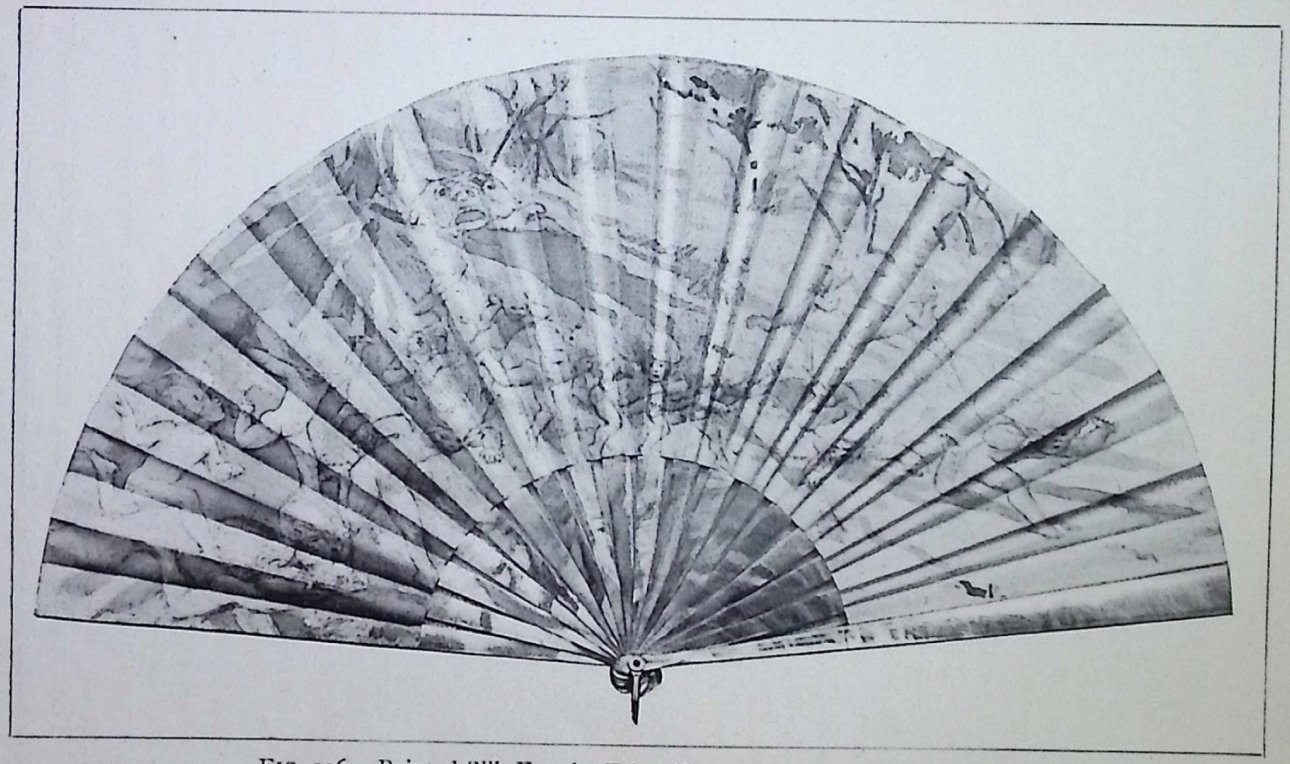


FIG. 126.—Painted Silk Fan, by Ethel King (Mrs. George Gascoyne).
(By gracious permission of Her Majesty the Queen.)

some need sizing. Rice size has been recommended, and also a little alum dissolved in water. I have found that ordinary "Fixatif" sufficiently prevents the undue spreading of transparent water colour. Conder and others have used the unsized material, the silk being tightly pinned over a sheet of white blotting-paper, which absorbs any colour percolating through the silk.

If body colour be employed it is obvious that it must not be used impasto, on account of its unpleasant cracking at the edges of the folds. Theoretically, although a certain amount of Chinese white is often an advantage, there is no doubt that the transparent method—a stain—is more suitable to the light material of silk, and this is the method that Conder employed.

Gold, both painted and leaf, may be introduced in painted silk fans with excellent effect. Mr. George Sheringham has recently produced some charming fan-leaves in which a lavish use of gold is made, following the practice of the older Japanese artists (Fig. 130).

Satin may, of course, be painted upon as well as silk, and presents a very rich surface. It was employed during the latter part of the eighteenth century for some of the engraved fans, for which it is most suitable. A good quality of satin is necessary for the purpose of printing upon, otherwise the material does not take the ink well.

The eighteenth-century practice of engraving fans might very well be revived by our modern etchers, who too often are at a loss to find a sufficient market for their work. The value of the present of an etching is materially enhanced if that present can be applied to some definite purpose, and particularly to such a charming purpose as a fan. The etched fans may be printed on satin in various colours, and with plain mother of pearl sticks, or even Sandal wood, look very rich.

The art of engraving, too, was largely employed during the whole of the eighteenth century as a foundation for

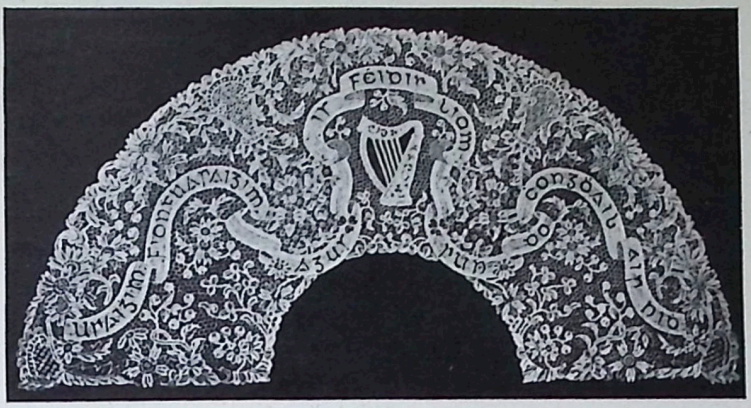


FIG. 127.—Lace Fan presented to Queen Alexandra in 1903. (Youghal Co-operative Lace Society.)

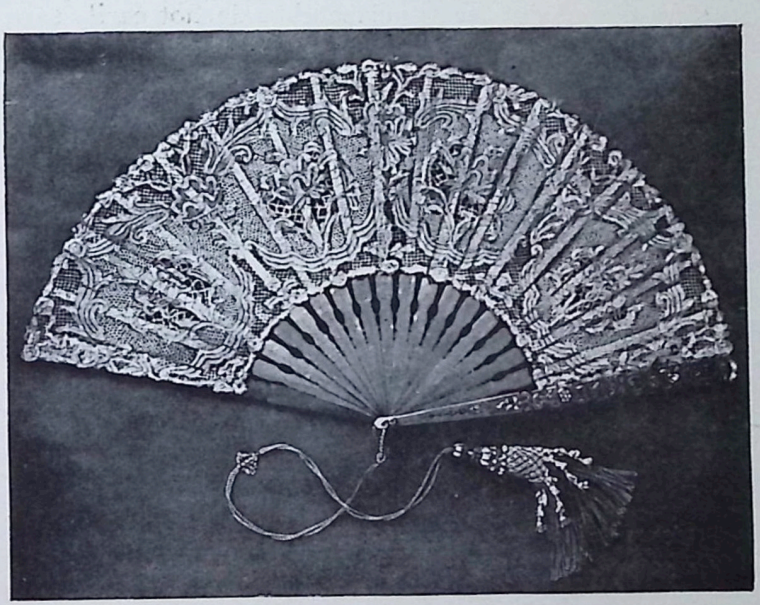


FIG. 128.—Lace Fan, designed by Frederick Vigers. (By the Courtesy of Lady Wakeman.)

subsequent painted work, often of a very elaborate kind, in many instances, doubtless, with the idea of passing them off as completely hand-painted.

These engravings or etchings were often printed on skin ; a number of printed but unpainted leaves (skin) are to be seen in the Schreiber Collection, British Museum.

This device of associating painting with engraving is also one that might very well be revived at the present time—some rapid and characteristic note on copper, the print further enlivened here and there by a touch of colour, would form a very attractive present.

Paper was largely employed during the eighteenth century for printed fans, for the cheaper painted ones, and also for some few of the more elaborate examples. The various Japanese rice-papers would, doubtless, be admirable for the purposes of the fan since they do not easily tear. It would be necessary, however, to work with the same directness as do the Japanese ; erasures are difficult to make, any degree of scrubbing with the brush is impossible as the surface is so easily destroyed. For printed fans, "Jap" papers are perfectly satisfactory.

The art of embroidery has been applied to the fan from comparatively speaking quite an early period. A Dutch seventeenth-century example occurs in the Wyatt Collection, Victoria and Albert Museum. It provides an excellent object-lesson in what to avoid. It is a landscape, worked over the whole field of the fan in a coarse silk thread, the effect, as a consequence, being heavy in the extreme. Both silk and satin are admirable for the purpose of embroidered fan-leaves, the designs of which should be of a light character, and worked in the finer silks. Very good embroidered fan-leaves have appeared from time to time at the different exhibitions of the National Competition Works at South Kensington.

Spangling was a favourite device during the latter half of the eighteenth century, when it was developed until the

whole design was made up of spangling. There is no reason why these pretty glistening ornaments should not be employed with great artistic effect. It has, in fact, been done in Germany, by Conrad Gauerwald and others, who have employed the process lavishly on an appliqué base of a different colour to the background, the effect being extremely rich and handsome.

The stick is at least as important as the leaf, and provides as much opportunity for artistic treatment. It is greatly to be regretted that the art of carving in Ivory, Shell, and Horn should have been so little practised by English craftsmen, the little that is done in this country being mainly executed by foreigners. The example given (Fig. 128) of a stained Ivory stick, designed by Mr. Frederick Vigers, was carved by a Japanese, Isuka, the stones being aquamarines and pearls. A feature of this fan is the beautiful and original tassel, also designed by Mr. Vigers, in which seed pearls form a feature of the ornamentation. The lace is coffee colour (Couleur Isabella), the whole colour scheme of the fan being particularly pleasant and harmonious.

There are two methods of gold enrichment, applied during the eighteenth century to Ivory, Mother of pearl, Tortoiseshell and Horn. In the one, gold, both leaf and painted, was applied; in the other the enriched portions were formed of metal riveted on the stick (incrustations). The effect of the rich sticks of the eighteenth century was further enhanced by an inlaying of the splendid Eastern mother of pearl called "Gold Fish," employed for the most part as a background to the carved and gilt ornamentation.

Sandal wood is an admirable material for fan-sticks; it may be carved with comparative ease, and further enriched by gilding. Mr. F. Stuttig has produced charming sticks in this method, examples of which were shown at the last Arts and Crafts Exhibition.

FIG. 129.—Designs for Carved Wood Fan-Sticks, by Ethel King (Mrs. George Gascoyne).

Horn is a beautiful substance, and is capable of great possibilities. During the eighteenth century a favourite enrichment was that of gold and silver piqué, in which the ornament consisted of little stars, spots or spangles inlaid.

There is still another material for fan-sticks, and the one which is, perhaps, most completely in tune with modern art tendencies. Silver filigree, when associated with enamel, provides almost endless possibilities for rich colour effects, the cool grey of silver contrasting most pleasantly to the rich enamel. The single thing to guard against is weight—the stick should be treated as lightly as possible.

The association of these two methods is an old device, having been largely practised by the Chinese during the seventeenth and eighteenth centuries, who also produced fans *entirely* of filigree and enamel, an example occurring in the Victoria and Albert Museum.

This leads us to the consideration of a second class of folding fan (*brisé*), which has no leaf, but is entirely made up of a number of blades either of Ivory, Tortoiseshell, Mother of pearl, the various woods, or, as above stated, in filigree and enamel, fastened in the usual way at the rivet, and further connected by a ribbon passing through each blade at or near the outside edge of the fan.

The brisé form was largely employed by the Chinese, who carved each blade with the most elaborate patterning. These fans usually had a monogram in the centre, being executed in most instances to the order of Europeans.

Brisé fans, both of Ivory and Sandal wood, were common during the latter part of the eighteenth century. In the case of Ivory they were usually decorated with one or more miniatures covering several blades, the divisions of the blades not interfering seriously with the effect of the picture. Oil was the medium invariably employed, although Mrs. George Forbes has an extremely fine

FIG. 130.—Fan-Leaf (Silk), by George Sheringham.

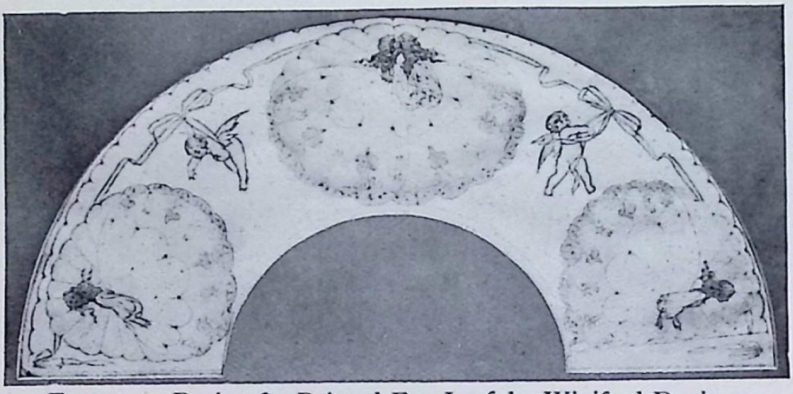


FIG. 131.—Design for Painted Fan-Leaf, by Winifred Davison (Bronze Medal Work, National Competition, 1911).

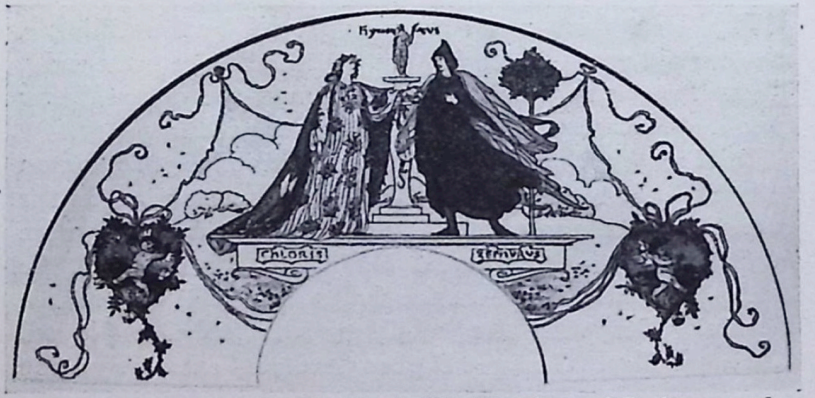


FIG. 132.—Design for Fan-Leaf—The Marriage of Zephyrus and Flora, by the Author.

example with miniatures in the manner of Cosway, painted in the usual process adopted by miniaturists on Ivory—*i.e.*, water. The objection to water colour is that it does not stand wear and tear so well as oil.

Sandal-wood fans were decorated both in oil and water, generally with floral designs, festoons, &c., a favourite *motif* being the Forget-me-not, the blue of the flower harmonising well with the wood.

The well-known "Vernis Martin" fans were brisé, painted, often in the most elaborate manner in the oil method on Ivory, and covered with the fine varnish discovered by the four Brothers Martin, coach-painters of the Faubourg Saint-Denis, Paris, during the earlier part of the reign of Louis XV.

The brisé form, during recent years, has been largely employed for the autograph fans of Sandal wood, in which each blade is decorated with a sketch by some more or less famous artist, occupying the upper and wider portion of the blade, with usually the signature beneath. This was initiated by Sir L. Alma Tadema, R.A., and has since been largely imitated, especially in Germany. The late Linley Sambourne possessed a remarkable one, decorated with the signatures and sketches of his artist friends.

This system of decorating each individual stick might conceivably be carried further, and opens up the general question as to how such an object as a fan, in which the design is necessarily more or less broken up or distorted by the pleatings, should best be decorated. Charles Blanc, though only in a half-serious way, suggests that "each pleat or fold should have a separate subject, or, at least, that the subject be so arranged that the pleats have relation to each other, as a Watteau harlequin kissing his hand to a Columbine, a Leander quarrelling with Isabelle, these being placed on blades that in refolding would reunite the lovers and reconcile the disputants."

The difficulty is, however, to some extent an imaginary

one, since the pleatings are one of the necessary concomitants of the fan, and are accepted just as are leads in stained glass, which actually strengthen the design rather than distort it.

It is, however, obviously necessary to take the pleatings into consideration in making a design; in fact, to make them the first consideration. Long continuous straight lines, especially in a similar direction to the pleatings, are to be avoided, and we here perceive the wisdom of the old fan designers in adopting the cartouche, the miniature panel, the meandering scroll, &c., in order to counteract the rigidity of the folds or pleats.

There is also, in figure designing, another important consideration—*i.e.*, the possibility of the edge of the pleats running across a face or other important feature of the design. This is to be avoided, so far as is possible, just as iron bars are avoided in stained glass; in fact, in this particular the two arts are similar.

It is therefore advisable, in commencing a design, to first set out the pleatings of the fan, or, better still, to have a tracing of the construction of the fan, which may be placed over the drawing by way of showing how far and in what manner the pleats affect the design.

A diagram is given from the mould of a well-known fan maker, of perhaps the most useful size, providing for a fan of sixteen sticks, counting the two outer ones. This will also serve to obviate the possibility, so common to beginners, of adopting a shape that will not fold (Fig. 125).

LACE.

Lace fans are here considered in connection with the general subject of lace, which forms an absolutely ideal material for fan-leaves, from its extreme delicacy, daintiness, and lightness. It is, however, perhaps the one single craft that has remained comparatively untouched by the

FIG. 133.—Lace Fan presented by the Worshipful Company of Fanmakers to Queen Mary on the Occasion of the Coronation, 1911. Designed by the Author.

modern decorative art movement. Lace workers usually possess no power of design; old forms are therefore repeated *ad nauseam*, and the work has, in consequence, an old-fashioned look, almost entirely out of keeping with the modern spirit. Betterment, however, can only come from the artistic side, either by the training of a set of workers in the knowledge of drawing and design, or by artists being willing to master the difficulties, or rather intricacies, of lace working.

The different classes of lace are :—

1. Tape lace, in which a continuous tape pattern is formed in various mazy curves, held in their place by various kinds of open work.

2. Plaited lace, in which the working is confined to one or two pairs of bobbins; most of the lace of early pattern books are of this character.

3. Grounded lace, in which a more or less close or solid pattern is imposed upon a ground-work of net.

4. Guipure. In this the ground-work of the pattern is formed, not by net but of plaits and twists.

There are also laces which more or less combine these several characteristics.

A word concerning the tools necessary for lace-making may not be out of place.

The first and most important is the pillow, which is of various shapes, cylindrical, bun-shaped, mushroom-shaped, &c. This should be stuffed hard and evenly with either hay (in which case something heavy must be placed in the centre to give it weight, and so prevent the pillow being dragged round by the bobbins), bran or sawdust mixed with silver sand or emery. This latter, although too heavy for any but a small pillow, prevents the pins from rusting, to which they are very liable in the case of hay pillows. Its different coverings should not be too closely woven, otherwise they would offer resistance to the pins. The cylindrical pillow, which is best for lengthy

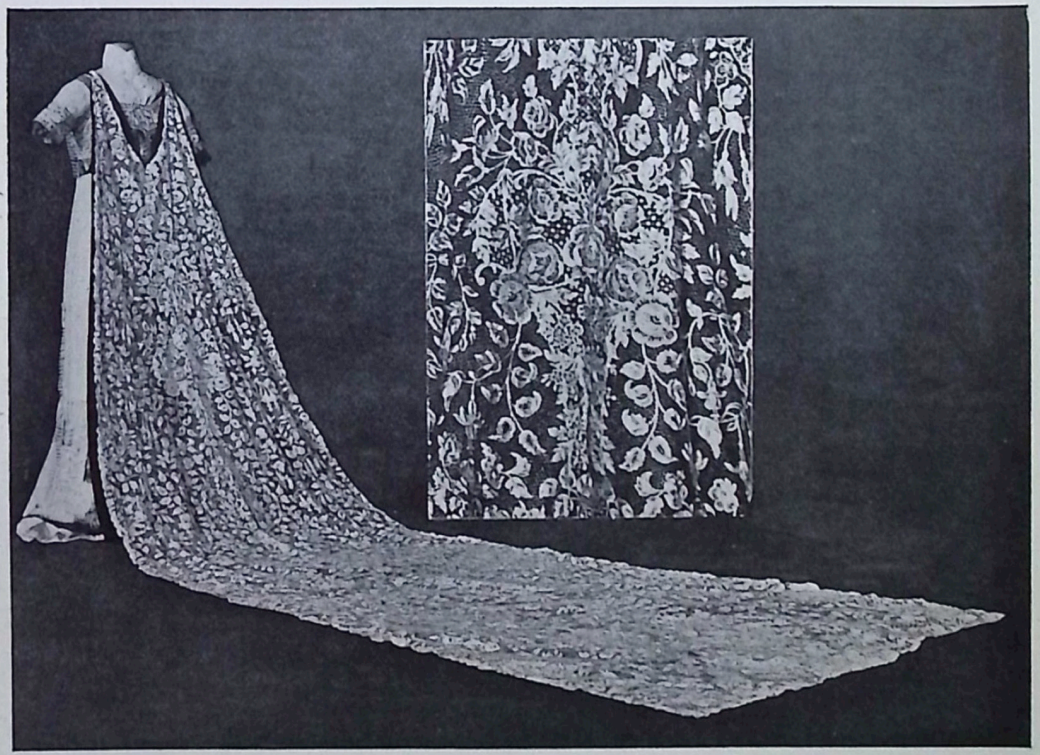


FIG. 134.—Court Train of Irish Needle Point Lace, presented as a Coronation gift to Her Majesty the Queen by the Ladies of Belfast and District. Designed and worked at the Presentation Convent, Youghal, Co. Cork, Ireland. (By the Courtesy of Messrs. Robinson and Cleaver.)

work, must have a wooden or other stand suitably shaped to receive the pillow, to steady it, and to raise it to a convenient position.

The mushroom-shaped pillow used by the Belgian workers is formed of a circular piece of board, padded and set upon a slope.

The bobbins are of various shapes, of wood, bone, and Ivory, turned, and occasionally ornamented in various ways for the purpose of distinguishing them. The usual English types are more or less straight and pencil-shaped. About a score of these are needed to commence with.

Pins, of which a number are required, are either of brass or steel, longer and sharper than ordinary pins, and varying in thickness according to the fineness or coarseness of the lace to be worked.

A bobbin-winder, though not an absolute necessity, greatly lessens the trouble of winding by hand, and may be made by an ordinary carpenter.

The above list, together with a fine crochet-hook, a pair of embroidery scissors, and some needles are all the tools necessary.

The thread most generally used is the best linen, of varying degrees of fineness, although silk, cotton, and even hair have been occasionally used.

The designs for lace are usually done in Chinese white, either on tracing paper or on some tinted paper or cardboard of a pleasant surface, rather smooth than otherwise. A plan adopted by many designers is to take a piece of brown or other tinted paper and first map out in white chalk the leading lines and masses of the design; when these are definitely settled the elaboration of the details is a comparatively simple matter. In planning out a design, the boundaries must always be firm so that the lace may hold well together; this, however, will be an obvious necessity.

There is no art in which a definite convention is so

absolute as in lace, from the necessity of conforming to the various stitches used. A high degree of naturalism therefore is not possible, although this does not by any means imply the lifeless copying of old forms; many suggestions may be taken from natural forms and growths, which are indeed the only true sources of inspiration provided the limitations of the material be taken into consideration.

An important matter, especially in particular kinds of lace, is the fillings. These are invariably made up of geometrical forms; they are one of the means of obtaining contrast, and may be varied almost indefinitely.

In conclusion, the necessity for lace workers to acquire some power of drawing and designing cannot be too strongly emphasised; the English worker would do well to imitate the dignity of the Dalmatian peasant, who makes her own designs, invents her own stitches, wears her own lace, and positively refuses to wear that made by other hands, thus actually attaining the ideal which Ruskin gave expression to, that "the real good of a piece of lace is that it should show, first, that the designer of it had a pretty fancy; next, that the maker of it had fine fingers; lastly, that the wearer of it has worthiness or dignity enough to acquire what is difficult to obtain, and common-sense enough not to wear it on all occasions."

CHAPTER XI.

POSTERS.

THE Poster, although essentially a modern development, contains nothing new in principle. The "sweet uses of advertisement" have been understood from a very early period, mural decorations of an advertising nature having been known in Egypt, Athens, Rome; on the walls of Herculaneum and Pompeii such painted announcements are in evidence to-day. In England theatrical play-bills have been used from the early part of the sixteenth century. John Northbrooke, writing in 1579, says: "They set up their bills upon posts some certain days before, to admonish people to make resort to the theatres."

The modern poster, however, so far as this country is concerned, may be said to have commenced in the late 'seventies with the appearance of Frederick Walker's famous cartoon advertising Wilkie Collins's "Woman in White," cut upon the wood by Mr. W. H. Hooper and printed in black alone (Fig. 135). With respect to this poster Walker wrote: "I am impressed on doing all I can with a first attempt at what I consider might develop into a most important branch of design." He was quite right; there can be no possible question of its importance, since, as in the case of dress, we have these things continually thrust under our notice; in fact, it is a moot point as to whether, in a completely civilised community—*i.e.*, a community in which the æsthetic sense is cultivated—there would not be some sort of artistic censorship appointed to regulate these matters.

FIG. 135.—Poster for Wilkie Collins's "Woman in White," by Frederick Walker, A.R.A.

FIG. 136.—Poster for *Black and White*, by Sir Hubert von Herkomer, M.V.O., R.A.

Walker's cartoon was quickly followed by several designed and engraved by Professor Herkomer, including a large sheet for the *Magazine of Art* and an excellent figure advertising *Black and White* (Fig. 136).

Walter Crane was one of the earliest men in the field and probably the first to make use of colour. His posters were conceived on the same principle as his well-known picture-books; as a matter of fact, were practically enlarged versions of his picture-book illustrations.

Among other distinguished artists who have essayed poster-designing may be mentioned H. S. Marks, whose two posters for Messrs. Pears are well known; Edwin Abbey, whose "Quest of the Holy Grail," a fine design of a knight on horseback, was commissioned by Mr. H. R. Russel of New York; Frank Brangwyn, who has quite recently done several for *The Studio*.

The poster during the last two decades of the nineteenth century became a cult, collectors sprang up everywhere, high prices being paid for rarities. A magazine was run which continued for some years, and included the various offshoots of the poster, as Shop Bills, Ball Programmes, Menu Cards, Pictorial Post-Cards, Calendars, as well as *Ex-libris*, Autographs, &c. A magazine devoted exclusively to the noble art of "Puff" might, one would think, have been adequately supported by the various advertising agencies.

In 1894 Aubrey Beardsley startled everybody by the daring originality of a small poster advertising "A Comedy of Sighs" for the Avenue Theatre, representing a woman standing behind a lace curtain, the poster being executed in flat colour with spotting for the half-tones, and printed in two colours, green and blue (Fig. 138). This was followed by two posters designed for Mr. Fisher Unwin; a larger one for the Pseudonym Library, in which the artist indulged himself in the luxury of four colours, and one for Children's Books in violet and black alone.

There can be little doubt that these things, limited as

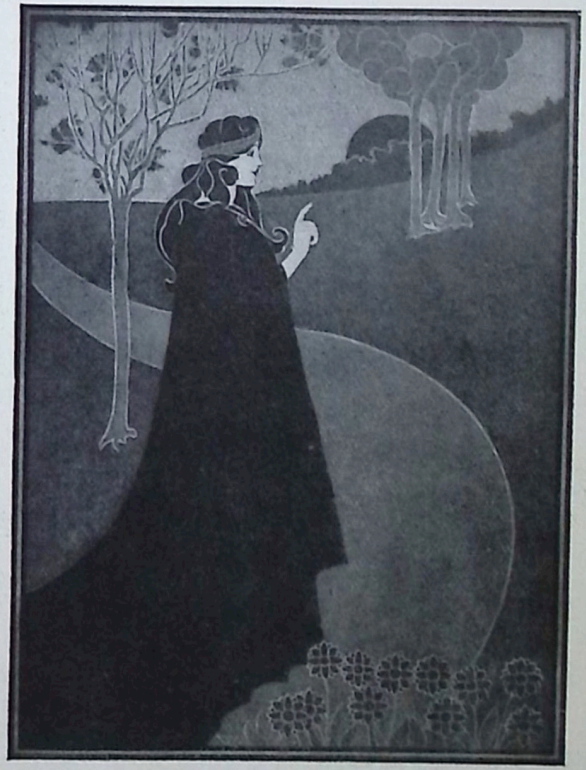


FIG. 137.—Posters, by Louis Rhead.

they were in number and in scale, exercised a far-reaching influence on the poster, since it was at once perceived that, in spite of their eccentricities, the principles upon which they were based, breadth and simplicity, sounded the true note.

Mr. Louis Rhead's productions in this branch of art may be said to be the logical outcome of Beardsley, although he professed to have founded his style upon that of Grasset. It was, in fact, Beardsley with the colour scheme developed (Fig. 137).

Mr. Rhead's method is to employ cartoon paper, the design carefully drawn in pencil from a small sketch to scale, usually by means of an enlarging apparatus. The colours are ordinary powder colours mixed with gum, white being mixed with the colours in almost every instance to render them opaque and the effect flat.

The two accomplished artists (Messrs. William Nicholson and James Pryde) working under the pseudonym of the Brothers Beggarstaff may be said to have carried the principle of flat silhouette to its utmost practical limit as applied to the poster, or indeed any sort of decorative work. It was developed, doubtless, from the use of black and white on brown paper, and this latter formed the foundation of many of their posters. In the well-known "Don Quixote," however, the background is light, the artists carrying their principle of simple flat masses so far as to cut out some of the forms in brown paper with scissors or knife and paste them on the cartoon (Fig. 139).

Occasionally outlines were abandoned altogether, even when the object was the same colour as the background. In the "Girl Reading," *a white dress on a white ground*, the limits of the dress are only determined in places by the red stripes of the sofa-back.

It was perfectly reasonable, indeed it is questionable whether these things did not entirely realise the ideal of a poster—a first glance, the message delivered *at once* and with the *utmost brevity*, and whether the employment of much

FIG. 138. — Poster for "A Comedy of Sighs," Avenue Theatre, by Aubrey Beardsley.

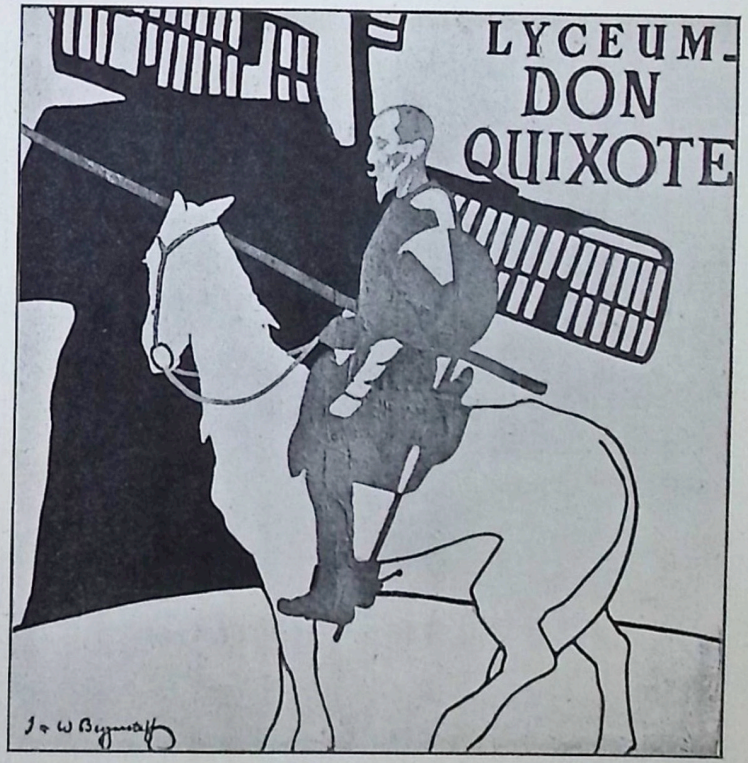


FIG. 139.—Poster or the Lyceum "Don Quixote," by the Brothers Beggarstaff.

detail is not entirely out of place. At any rate, they served their purpose admirably, they compelled attention from their very unlikeness to anything else seen.

Lithography was invented by Aloys Senefelder of Munich about 1798. The designs are drawn upon a compact, homogeneous slaty limestone, presenting a smooth surface when polished, the medium being either liquid ink applied by means of a brush, or black prepared chalk for drawn work; in each case the principal ingredient is grease. The surface of the stone is etched or eaten away by a weak solution of nitric acid, the parts drawn upon being unaffected by the etching medium. The design is therefore elevated above the surface to an imperceptible degree, so that an inked roller on being passed over produces an exact representation of the drawing, which is previously removed by means of a solvent. The desired impression may then be obtained by passing the stone through the press. As chromo-lithography requires the employment of as many stones as there are colours, and these stones are extremely cumbrous and unwieldy, the great value of economy in colours will be appreciated. The recently introduced process of Algraphy, by which an aluminium sheet is substituted for the lithographic stone, has materially influenced poster printing, especially in the larger sizes.

It will thus be seen that the production of the larger and more elaborate posters is an expensive matter, the famous "Bubbles" costing £2 per copy.

The lettering of a poster is necessarily of the first importance, since it is impossible for it to deliver its message completely by means of pictorial illustration. It may be made to form an integral part of the design, as in the fine poster designed by Mr. Anning Bell for the City of Liverpool School of Architecture and Applied Art. This was printed in self colour, a dark bronze green, and measured 9 feet.

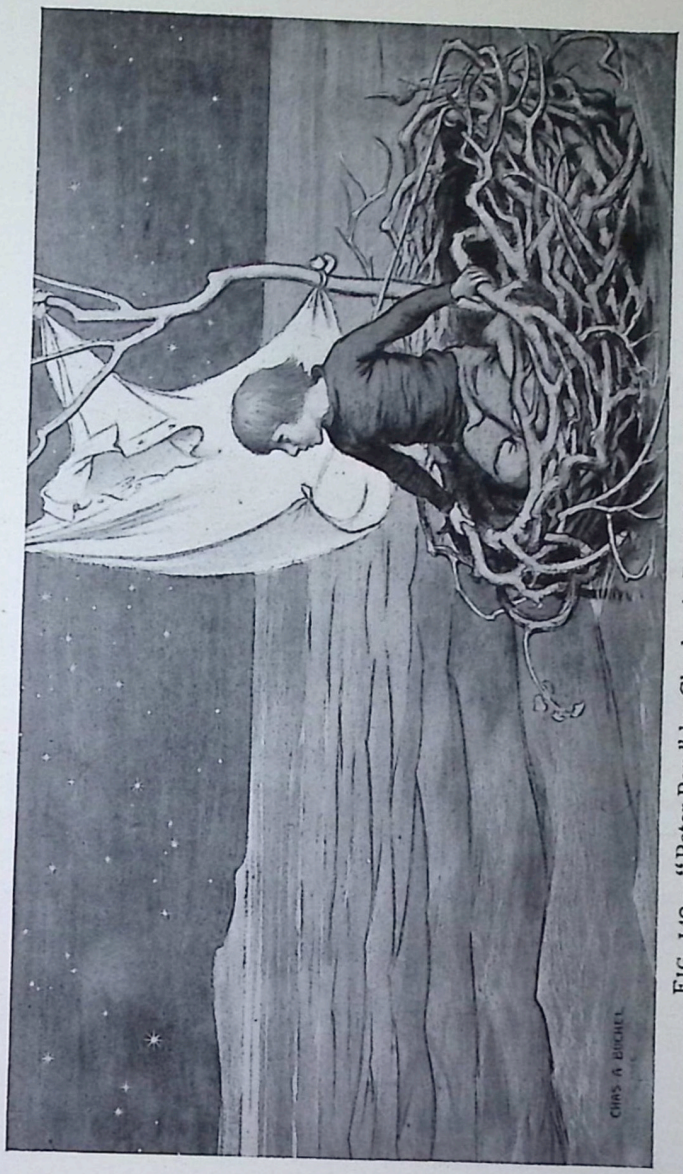


FIG. 140.—"Peter Pan," by Charles A. Buchel, from the Original Drawing.
(By the courtesy of J. M. Barrie, Esq.)

The qualities of a successful poster are by no means easy of attainment. The artist must possess the knack of hitting off the public taste, of tickling the public palate by means of a happy idea that retains its hold upon people's minds.

In ordinary mercantile work the hints given must be good broad ones; it serves little purpose to fence and beat about the bush; the ideas no less than the artistic effect must tell the whole width of the street, refinements both of idea and detail being entirely out of place.

It must be confessed that the artistic poster has not fulfilled the high expectations entertained of it—*i.e.*, as the precursor of mural decoration. It was valued not so much on account of what it actually accomplished as for what it might lead to. Moreover, the business firms have not consistently supported it, and in many instances have abandoned a really fine thing for a purely trade production, as, apparently, in the case of the excellent and amusing poster by Mr. John Hassal of the Two Microbes, advertising Salutaris Water. Nevertheless, a certain proportion of really good work is still being done, and we may hope as public taste becomes better educated that this proportion will increase. Mr. Dudley Hardy affirms that "there are no finer canvases than the public hoardings and no more critical audiences than the London streets," and though we may find no difficulty in agreeing with the first portion of the statement, the quality of the criticism referred to may possibly leave something to be desired.

INDEX.

A.

Abnormal growths, 5
Achenes, 51
Algraphy, 238
All-over patterns, wall papers, printed fabrics, textiles, 71—90
"All-over" patterns, 61, 65, 81, 100, 102, 112
Alma Tadema, Sir L., R.A., 225
Alternation, 64
Annealing, 163, 171
Apple, 48, 51
  form of, 51
Appliqué, 191, 204
Aquatint (the fashion plate), 212
Armour (in fancy dress), 200
Aumonier, W., 184, 185
Axminster carpets, 88, 90

B.

Background, treatment of, 61
Bassetaille, 168
Beaded wire, 167, 168
Beardsley, Aubrey, 234, 236
Beggarstaff Brothers, 236, 238
Bell, Anning, 238
Bench (Jewellery), 160
Blanc, Charles, 225
Blow-pipe, 163
Bobbins, 230
Bobbin winder, 230
Body colours, 72, 73, 85, 87, 90
Book covers, 110—117
  cloth, 113, 117
  leather tooling for, 111, 113
  two great classes of, 111
Book decoration, 91—117
  frontispiece for, 100
  lettering and type for, 92, 98
  methods of black and white illustrations for, 94, 96
Book, ornamental initials for, 94
  page proportioning, 91, 92
  systems of page decoration, 92
  "three colour" process for, 94, 95
  title pages, 96—102
Border, treatment of, 61, 68—70, 150
Borders, angles of, 68, 69
  continuous, 68
  for book decoration, 92
  interlacing, 70
  leading lines of, 67
  rectangular, 68
  unsymmetrical, 70
Bracts, 34
Brisé, 223, 225
Brocade, 86
Brocatelle, figuring of, sizes for, 86
Brussels carpets, width of, medium for designs for, length of repeats of, 88, 90
Bryony, white, 26, 27
Bud scales, 27
  the, 23—27
Buds, axillary, 23
  primary, 23
  protection of, 27
  setting of on stem, 25, 26
  symmetry of, 23, 26
Bulb, 13, 23
Burnisher, 160, 167

C.

Calyx, the, 37—39
  compound, 43
  variation of form of, 37, 38
Canary creeper, 3, 67, 204
Capsules, 49
Carpets, 82, 87—90
  borders for, 88
  classes of, 88
  "planting" colours in designs for, 88
  working drawings for, 88, 89

Casting flasks (metal work), 159, 160
Catkins, 44
Celandine, lesser, 9, 13
Champleve (enamel), 168, 169
Chenille, repeats of, sizes of, medium of design for, 87
China clay, 120
Chip carving (woodwork), 181, 182
Clay wedging, 123, 125
Climbing plants, 14, 16, 18
Cloisonné (enamel), 168—171
(pottery), 127
Cloth covers (book decoration), 113—117
colours employed on, 113, 115
designing for, 115—117
essentials of, blocks for, 113
Colour, 56, 58, 60, 62
Colour processes, 94, 96
Colours (pottery), 130, 131, 133, 135, 136
Continuity, 60
Convolvulus, in Egyptian art, 16
Corolla, 37, 40
Couching (embroidery), 189—191
Crane, Walter, 234
Cretonnes, 83
painting of reversible, 83
width of, 83
Cuttle-fish bone (jewellery), 159, 160
Cypress wood, 177, 178

D.

Dalmatian peasant, 231
Damasks, 85, 86, 187
method of making designs for, 86
widths of, 85
Dandelion, 3, 30, 38, 51, 53
Dead nettle (white), 3
Decorative or ornamental principle in Nature, 1, 2
De Morgan, William (lustre), 137, 138
Development, decorative principle of, 10, 11, 15, 54
Diapers, 62, 193
Dominoes (fancy dress), 201
Doubling, ornamental value of, 55, 56, 67
Draw-plate, 167, 169
Drawn thread work, 191, 193
Dress embroidery, fancy costume, the fashion plate, 187—213
Drilling (jewellery), 168
Drop repeat, 77, 79, 83
Drupes, 51
Dürer, Albert (ex libris), 110

E.

Earthenware, composition of, 119, 131
Ebony, 176, 179
Embroidery, 187—197
colour in, 197
designing for, 193, 197
frames for, 188, 189
materials suitable for, 187, 189
on fans, 220
stitches, 189—191
Embryo, 6
Enamel (metal), 168—171
(pottery), 135—137
End papers, 102—105
designs for, 104
subjects for, 104, 105
Engraving, 218, 220
Etching, 105—107, 108, 110, 218
Examinations in ornamental design, 55, 62
Ex Libris, 105—110
dimensions of, 108
heraldic, 109—110
methods of production, 105—108
portrait, 109
utility of, 108

F.

Fan (folding), 214, 215
Brisé, 223, 225, 226
designing for the, 226
embroidery applied to the, 220
engraved, 218
enrichment of stick of the, 221—223
materials of leaf of, 216
painted, 217, 218
parts of the, 215
pleatings of leaf of, 214, 225, 226

Fan, proportions of the, 214, 216
spangling on the, 220
stick of the, 221—226
variations in size of the, 216
"Vernis Martin," 225
Fancy dress, 199—206
armour in, 200, 201
characters or subjects for, 199—204
dancing in relation to, 199—201
floral motifs for, 201—206
materials for, 206
stencilling applied to, 206
Fancy dress ball, 200, 201
Fans and lace, 215—231
Fashion Plate, the, 206—213
definition of the, 208, 212
distinguished artists associated with the, 208, 210, 212
importance of, 213
making drawings for, 213
methods of reproduction, 212
Field daisy, 43, 63
Filet nets, 189
Filigree, 223
Fillings (lace), 231
Fixatif, 218
Floor cloths, 83, 85
Floral form, geometrical basis of, 26
Flower, the, 36—46
forms, 40
parts of the, 36—37
primary object of the, 36
Flowers, bell-shaped, 40, 42
compound, 38, 43
labiate, 42
spurred, 42
stellate, 40, 42
thistle-shaped, 43
Follicles, 48
Frames (embroidery), 188, 189
French knots, 191
Fritting (pottery), 135
Fruit and seed, the, 48—54
dispersion of, 53
Fruits, compound, 48, 51
dehiscent, 48
dry, 48, 49
indehiscent, 48, 49
spurious, 48
succulent, 48, 49, 53
true, 48, 49
varieties of, 48

G.

GAUGE-PLATE (metal work), 167
Germination, *modus operandi* of, 6
Gilding (woodwork), 185, 186
Glazes (pottery), 129
Glazier's diamond, 146
Glazing, methods of, 129, 133, 135
Gold (pottery), 139
liquid, 139
on fans, 216, 218, 221, 223
Gold-tooling (bookbinding), 111—113
designing for, 112
method of, 111
roulette for, 112
Gouache, 216
Grisaille (stained glass), 144
Grounded lace, 228
Guipure, 228

H.

HAMMER, repoussé, 160
raising, 160, 161
Hangings, foldings of, 86
Hardy, Dudley, 240
Hassal, John, 240
Herkomer, Professor, 234
Hollar, 210
Hooper, W. H., 232
Horn (fan), 221, 223

I.

INCISED work (wood), varieties of, method, designing for, 177, 178
"Inhabited" designs, 81
Interfoils, 31—34
Interlacing ornament, 62, 68, 70
Involucre, 39, 44
Ivory (fan), 221, 223, 225
(woodwork), 176, 179
Ivy, 18, 23, 30

J.

JACQUARD loom, 86, 88
Japanese plant drawing, 30
patterns, 63

Jewellery, 167, 168, 171
beaded wire for, 167
designing for, 169, 171
melting grains for, 167
precious stones for, 168
soldering, 167
wire and tube drawing for, 167
Jewels, 168

K.

Kiln, 127, 129, 130, 133, 136, 137, 139

L.

Lace, 226—231
bobbin winder, 230
bobbins, 230
classes of, 228
designing for, 230, 231
fillings, 231
pillow, 228, 230
pins, 230
thread, 230
tools for, 228
Langdale linen, 188
Leaf, the, 27—35
parts of the, 27
Leather inlay (book covers), 112, 113
relief ,, 113
Leaves, compound, 44
divisions of, 27, 30
incipient, 13
principle of growth, 30
sheathed, 34
texture of, 34
types of, 28
variations of, 27, 35
veining of, 30, 31
Legumes, 48
Lettering, 98, 100, 102, 238
Limoges (enamel), 168
Linear planning in ornament, 56—58
Linoleums, 83
medium of designs for, 85
method of printing, 83
width of, 85
Lithography, 238
Lustre, composition and firing of true, 137, 139
medium for, 139
metallic, 139

M.

Maccaroni tools, 173
Mahogany, 176
Majolica body, 120
Mallet (wood working), 176
Marquetry, 179, 181
stringings for, 181
woods used in, 179
Marriage coffers, 177
Martin Brothers, 129, 225
Masses, disposition of, 60
Material and method, their limitations, 71, 81, 83, 110, 113, 231
Matting (stained glass), 153, 155, 156
Matts, 145, 178
Meander, 67
Metal,
annealing, 163, 167, 171
casting, 158—161
chasing, 163, 165
gauge, 167
grains, 167
hammered, 161, 163
ingots, 158
models for, 158, 159, 160
moulding, 159
pickling, 163
punches, 160, 163, 165, 166
repoussé, 158, 163, 165, 166
soldering, 166, 167
strips, 169
tracing, 165
Metal work and jewellery, 158—171
Morris, William, 61, 71, 72, 91, 92, 98
Mother of pearl (fan), 221, 223
(woodwork), 176, 179
Moulding, for pottery, 123
piece, for metal, 159

N.

National competition, 170, 206, 211, 220, 224
Nodes, 13, 20, 34

O.

Oil stones, 175
Orchis, 9

Ornament, foliated, 62
geometrical, 62
interlacing, 62, 68, 70
Ornamental principle in nature, 1, 2
filling of spaces, 55—70
Ovary, 37, 43, 48
Oven, 127, 130, 133

P.

PANELS, setting out of, 58, 60, 61
Pâte-sur-pâte, 125
Perianth, 38
Pillow (lace), 228, 230
Pitch (carpets), 88, 90
Pitch block, 160, 165
Plain glazing (stained glass), 144, 152
Plaited lace, 228
Plant form as basis of ornament, 1—54
studies, method of making, 3, 5
Playing cards (fancy dress), 201
Pleatings (fan), 214, 225, 226
Plique à jour, 169
Plumule, 6. 23
Pocket-books (the fashion plate), 210
Porcelain, 119, 129, 131
Posters, 232—240
antiquity of, 232
artistic, 240
artists associated with, 234
craze for collecting, 234
expense of production of, 238
importance of, as a branch of design, 232
lettering of, 238
method of production of, 238
modern development of, 234
qualities of successful, 240
treatment of by different artists, 234—238
Pot-metal (stained glass), 143, 144
Potter's wheel, 121
Pottery, 119—140
bodies or clays used in, 119, 120
"built," 120, 121
casting for, 121, 123, 127
contraction of clays in, 123
cracks in, 127
designing for, 139, 140
different conditions of clays in, 125
drying of before firing, 127
firing of, 129, 130
Pottery, glazes for, 129
glazing, 129, 133, 135
gold used on, 139
kilns, 139
lustres, 137—139
methods of making, 120
models for, 123
moulding for, 123
painting (overglaze), 135—137
(underglaze), 130—135
placing of in kilns, 127, 130
pressing, 123, 125
throwing, 121
turning, 121
Pouncing, 197
Powdering, 62, 63
Printed fabrics, 81—85
complication of patterns for by folds, 81
machine printing, 83
methods of printing, 82
Process illustration, scale of drawings for, 96
reproduction, 212
Publisher's mark, 98
Punching (woodwork), 178

R.

RADIATION, 58
Radicle, 6
Raised work (embroidery), 191
Raising, 160, 161
Relief (woodwork), treatment of, 182, 183
enrichment, 185
Repeating patterns, 63, 65, 75, 83, 104, 181
method of proving, 79
Repetition, simple, 67
Reuter, E. G., 104, 109
Rhead, Louis, method of poster designing, 236
Rhizomes, 14, 18—20
Rice paper, 220
Root, the, 5—11
caps, 9
classes of, 7
decorative value of, in ornament, 11
general character of, 5
lateral, 9
primary, 9

Root systems, 7, 9, 10
Roots, fibrous, 7, 9
aerial, 9, 15, 18
Runners, 14, 18
Ruskin, 231

S.

Salt glazing, 129
Sandal wood, 176, 221, 223, 225
Satin, 187, 218, 220
Schreiber collection, 220
Scraffito, 121, 125, 127
Seed, the, 49, 54
Seeds, classes of, 49, 51
dispersion of, 53
explosive action of, 53
form of, 54
tufted, 51
Seger test cones, 126, 129
Setting (jewellery), 168
Sharpening (woodwork), 175
Siliquæ, 49, 50
Silks, 187, 189, 216, 220
Silver filigree (fan), 223
Sinking block, 160, 163
Slip, 120, 121, 123, 125, 127
Snarling iron (metal work), 160, 163
Soldering, 167
Spandrils, 60, 61
Spangling, 220, 221
Spires, 46
Spotting, 62, 63
Sprigs, 62, 63
Stained glass, 143—157
aciding, 157
bars in, 143, 144, 146
cartoons for, 146—151
colour sketches for, 144, 146
"cut line" in, 151, 153
cutting, 151, 153
firing, 156
flashing, 143, 157
kilns, 156
leading, 143, 145, 146, 147, 148 156, 157
painting, 153—156
principle or method of, 143, 144
proportion of figures in, 150, 151
stains for, 144, 149
treatment of drapery in, 149, 150
white line in, 145, 146
Stakes (metal), 160, 161
Stem, the, 11—21
axial office of, 11
Stems, articulated, 13, 14, 21
classes of, 11
climbing, 14
erect, 14
general character of, 21
revolving, 15
section of, 20
simple, 11, 13
surface of, 20
Stencilling, 204, 206
Stipules, 31—35
Stringings (woodwork), 181
Stuttig, F., 221
Superposition, 70, 81
of colours in designs for printed fabrics, 82
on pottery, 137
Sycamore, 25, 27, 53
Symmetry, law of in plant form, 26
,, ,, ornament, 56

T.

Tangential Junction, 60
Tape lace, 228
Tapestries, number of colours introduced in designs for, sizes of repeats of and borders for, 87
Template (stained glass), 146
Tendrils, 15, 16, 27, 60
Terra cotta, 119
Testa, 6
Textile fabrics, 85—90
brocatelle and brocade, 86
damasks, 85, 86
method of weaving, 85
tapestries, 87
woollens and cottons, 87
Thistle, 33, 34, 35
Thorns, 16, 20, 33
Three-colour process, 212
Title pages, 96—102
lettering for, 98, 102
methods of production of, 96
systems of designs for, 100
Tortoiseshell (fan), 221, 223
Tube drawing, 167
Tubercles, 9
Tubers, 9, 10, 14
Twining plants, 16

U.

UMBELLIFERS, 33, 44

V.

VELLUM, use of gold on for book covers, 115
for fans, 216
Veneers, 179, 181
Vernets, the, 210, 212
"Vernis Martin," 225
Vice, 161, 173
Vigers, Frederick, 221
Virginia creeper, 12, 16, 18, 23, 33
Vine, 15, 60, 67
V-shaped tool, 173, 175, 177, 178, 179, 182

W.

WALKER, Frederick (posters), 232, 233
Wall papers, 72—81
backgrounds of designs for, 81
block register for, 73
colours for designs for, 72
method of printing, 72
setting out designs for, 75
shading, 72
number of colours employed in, 73
Wall papers—
outlines of designs for, 80
repeats of, 75, 76, 77, 78, 79
scale of designs for, 75
size of, 73, 77
Waste wax process, 158, 160, 161
White, Gleeson, 108, 117
White lining, 80
Wild strawberry, 4, 31
rose, 16, 36
Wire drawing, 167
Wood-carving, colouring, 186
designs for, 182, 185
gilding, 185, 186
sharpening tools for, 175
tools for, 173, 175
treatment of relief, 182—186
woods for, 176
Wood engraving, 105
Wood inlay, 179—181
Woodwork, designs for, 177, 178, 185
incised, 174, 176, 177, 178
punched, 178
Wood working and carving, 173—186
bench for, 173
Wyatt collection, 220

Z.

ZINCO process, 94, 104, 113

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